## CONTRIBUTION FROM THE DEPARTMENT OF CHEMISTRY, BRIGHAM YOUNG UNIVERSITY, PROVO, UTAH

# High-Pressure, High-Temperature Syntheses of Selected Lanthanide-Tellurium Compounds

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Tetragonal LTe<sub>2-x</sub> ( $0 \le x \le 0.3$ ) compounds were synthesized for the following lanthanides with lattice parameters ( $a_0$ ,  $c_0$ ) and standard deviations were determined as indicated (values in Å): Y, 4.291 (3), 8.912 (6), Ho, 4.264 (2), 8.872 (4); Er, 4.248 (2), 8.865 (5); Tm 4.240 (2), 8.831 (4); Lu, 4.222 (1), 8.807 (3). Orthorhombic LuTe<sub>3</sub> with lattice parameters ( $a_0$ ,  $b_0$ ,  $c_0$ ) 4.277 (1), 25.137 (6), 4.278 (1) Å was also synthesized. Pressures to 100 kbars with temperatures to 1200° were employed in the studies, and the *P*-*T* regions required for synthesis were delineated. The new compounds are extensions of the LTe<sub>2-x</sub> and LTe<sub>3</sub> series previously reported through Dy for LTe<sub>2-x</sub> and through Tm for LTe<sub>3</sub>.

#### Introduction

Compounds of the type  $\text{LTe}_{2-x}$  ( $0 \le x \le 0.3$ ) and  $\text{LTe}_3$  (L= lanthanides, Sc, Y) have been studied since 1958. The  $\text{LTe}_{2-x}$  compounds are tetragonal with space group P4/nmm<sup>1</sup> whereas the  $\text{LTe}_3$  compounds are orthorhombic (pseudotetragonal) with space group Bmmb.<sup>2,3</sup> The similarity of these two structures has been described by Wang and Steinfink.<sup>4</sup> They show that the essential features of the  $\text{LTe}_3$  structure may be constructed by stacking slightly distorted  $\text{LTe}_{2-x}$  units with alternate cells shifted by  $1/2a_0$ .

The  $LTe_{2-x}$  compounds have been reported<sup>1,3,4,5,6</sup> for L= La, Ce, Pr, Nd, Sm, Gd, Tb, Dy, Yb and those of the LTe<sub>3</sub> type<sup>2,3,7,8,9</sup> for L= La, Ce, Pr, Nd, Sm, Gd, Tb, Dy, Ho, Er, Tm, Y. Pardo, et al.,<sup>5</sup> reported that the  $LTe_{2-x}$ compounds existed only for L = La-Dy, and Wang and Steinfink<sup>4</sup> mentioned that attempts to prepare HoTe<sub>2-x</sub> and ErTe<sub>2-x</sub> resulted in mixtures of the mono- and tritellurides. The latter authors suggested that the formation of LTe<sub>2-x</sub> LTe<sub>3</sub> compounds depends on the ionic radius of L. As the ionic radius of L decreases, the Te-Te distance in the basal plane of both types of compounds becomes shorter. When that distance is predicted to be 3.015Å or less, the compound does not form. A Te-Te distance of 3.015Å was predicted for HoTe<sub>2-x</sub> and for LuTe<sub>3</sub>. Thus LTe<sub>2-x</sub> compounds for L= Ho, Er, Tm. Lu, Sc, and LTe<sub>3</sub> compounds for L= Lu, Sc should not form.

Table I Comparison of L/Te Radius Ratios Under Ambient and Compressed Conditions

			Compre		
	Metallic	Compr	ssed		
	Covalent	essed	L/Te		
	Radius, <sup>a</sup>	radius <sup>b</sup>	radius	Differe	ence <sup>d</sup>
Element	Å	Å	ratio <sup>c</sup>	LTe <sub>2-x</sub>	$LTe_3$
Sc	1.48	1.39	0.97	-0.05	-0.04
Y	1.648	1.488	1.04	+0.02	
Но	1.632	1.518	1.06	0.04	
Er	1.620	1.507	1.05	0.03	
Tm	1.613	1.500	1.05	0.03	
Lu	1.597	1.485	1.04	0.02	0.03

<sup>*a*</sup> Determined by extrapolation of the values for the lighter lanthanide metallic covalent radii for the LTe<sub>2-x</sub> structure from R. Want, Ph.D. Dissertation, The University of Texas, 1967. <sup>*b*</sup> Estimation based on data for Sc, Y, and La at 100 kbars from H. T. Hall, *Progr. Inorg. Chem.*, **7**, 1 (1966).

<sup>c</sup> Atmospheric pressure Te radius is 1.60 Å, and the compressed Ta radius is 1.43 Å.

<sup>*d*</sup> Difference represents the L/Te radius ratio in column four minus the L/Te radius ratio for  $DyTe_{2-x}$  or  $TmTe_3$  (1.02 and 1.01 Å, respectively).

Since Te is more compressible than L, synthesis of the above-mentioned  $LTe_{2-x}$  and  $LTe_3$  compounds should become more favorable as the pressure on the reaction mixture is increased. Table I shows a comparison of the L/Te radius ratio under ambient conditions and under pressure. If the L/Te radius ratios in DyTe<sub>2-x</sub> and TmTe<sub>3</sub> represent the lower limits for compound formation, then Table I shows that the

application of pressure causes the L/Te radius ratio to become favorable for formation of previously unknown  $LTe_{2-x}$  and  $LTe_3$  compounds. Consequently, high-pressure techniques were used in an attempt to synthesize these compounds. Attempts were also made to prepare  $Yte_{2-x}$  since it had not been formed previously.

# **Experimental Section**

The high pressures and temperatures necessary for this work were generated in the tetrahedral apparatus developed by Hall.<sup>10,11</sup> The sample geometry is shown in Figure 1. After the sample was assembled, the pyrophyllite exterior was painted with a slurry of red iron oxide in methanol and then baked for at least 0.5 hr at 110°.

Synthesis experiments were carried out as follows. The pressure was increased slowly to about 5 kbars and rapidly thereafter to the desired pressure. An electric current was then passed through the graphite heater at a specific wattage for an appropriate time. The sample was then quenched by cutting off the current (cooling to 50 or  $60^{\circ}$  occurred in about 5 sec) and the pressure was returned to normal. The reaction mixture was removed from its container and X-rayed immediately.

The temperature of each run was determined indirectly from calibration curves of power input (watts) vs. temperature. These curves were prepared<sup>12</sup> by making prototype synthesis runs in which a platinum-platinum-10% rhodium thermocouple was placed. Data were taken at 50-W (about 150°) intervals for pressure of 14, 36, 52, and 69 kbars. Above 450° temperatures are good to  $\pm$  6% and below 450° to  $\pm$  8%.

Pressure calibrations<sup>12</sup> were based on Ce (8.1 kbars), Hg (12.2 kbars), Bi I-II (26.5 kbars), Tl II-III (35.4 kbars), Yb I-II (38.2 kbars), and Ba I-II (54.6 kbars) transitions.<sup>13,14,15</sup> Pressure calibration runs were made at room temperature with the calibration sample surrounded by AgCl. The pressure transitions were reproducible to  $\pm 0.3$  kbar.

The metals (less than 0.1% lanthanide impurity) were obtained in ingot form from Research Chemicals, Inc., Burbank, Calif. (Ho, Er); Research Chemicals, a division of Nuclear Corp. of America, Phoenix, Ariz. (Sc, Y, Lu); and Alfa Inorganics, Beverly, Mass. (Tm,). The Te (99.99+% pure) was purchased in lump form from the American Smelting and Refining Co.

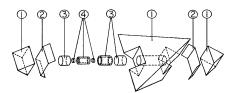


Figure 1.—Tetrahedral sample arrangement: (1) pyrophyllite; the triangular prisms are approximately 0.25 in. wide by 0.25in. high; the tetrahedron has a 1-in. edge with a hole 0.125 in. in diameter and 0.25 in. long; (2) molybdenum;  $0.005 \times 0.25 \times$ 0.50 in.; (3) graphite; the end plugs are 0.125 in. in diameter and 0.05 in. long; (4) boron nitride; the end plugs are 0.055 in. in diameter and 0.025 in. in o.d., 0.086 in. in i.d., and 0.150 in. long; (4) boron nitride; the end plugs are 0.055 in. in diameter and 0.150 in. long; the tube is 0.085 in. in o.d., 0.055 in. in i.d., and 0.150 in. long.

The metal ingots were filed and those filings ( $\leq 0.149$ -mm diameter) that passed a 100-mesh sieve were used. Since the lanthanide metals tend to oxidize, about 100 mg was filed and then used before more filings were made. The Te lumps were crushed and that portion ( $\geq 0.074$ -mm diameter) which did not pass a 200-mesh sieve was used. Appropriate amounts of the metal and tellurium were weighed (to the nearest 0.2 mg) and mixed with a spatula by hand.

Initially, syntheses of the LTe<sub>2-x</sub> compounds were made using a 1:2 L/Te ratio. Since x tends toward 0.3 for the heavier lanthanides, this resulted in a high LTe<sub>3</sub> impurity in the final product. Because of this, the L/Te ratio was changed to 1:1.7, and the majority of the syntheses were made using this latter ratio.<sup>16,17,18,19</sup> Most runs were made for about 60 min, although some were conducted for as short as 5 sec and as long as 348 min. A 60-min synthesis of HoTe2-x at 52 kbars and 1280° was of sufficient duration to give a complete reaction, but syntheses of HoTe<sub>2-x</sub> for L = Er, Tm, Lu, Y resulted in partial reaction, the major impurity being LTe<sub>3</sub>. For each run, the synthesis was considered successful if the most intense lines characteristic of the desired compound were present in the X-ray spectrum of the final product.

The LTe<sub>3</sub> syntheses were made using a 1:3 L/Te ratio. Reaction times were varied from 5 to 60 min. In general the X-ray spectra contained lines other than those characteristic of LuTe<sub>3</sub>. Because LuTe<sub>3</sub> decomposes so rapidly, it is difficult to know whether the excess lines resulted from incomplete reaction or decomposition. A successful synthesis was decided on the same basis as the LTe<sub>2-x</sub> syntheses.

All X-ray work utilized Ni-filtered Cu K $\alpha$  radiation. The Debye-Scherrer powder camera

was 143.2 mm in diameter, and the sample was rotated during exposure. Glass capillaries of 0.5mm diameter were used to mount the samples. Splitting of the low-angle lines in the X-ray spectra was observed in some of the photographs. This splitting was due to the high absorption of the X-rays by the sample and created no problem. Intensities were visually estimated.

The compounds prepared include L = Ho, Er, Tm, Lu, Y for  $LTe_{2-x}$  and  $LuTe_3$ . Pressures to 100 kbars with temperatures to 1200° were used in attempts to prepare  $ScTe_{2-x}$  and  $ScTe_3$ , but all efforts met with failure.

## Results

The pressure-temperature synthesis diagrams for  $\text{ErTe}_{2-x}$  and  $\text{LuTe}_3$  are shown in Figures 2 and 3. The general features of the other synthesis diagrams are the same as that of  $\text{ErTe}_{2-x}$ . The main differences are outlined in Table II. As was expected, the minimum pressure requirement for synthesis has an inverse relationship to the ionic radius. This indicated that the Te-Te distance in the basal plane is at least partially responsible for the nonformation at atmospheric pressure of the compounds prepared in this study.

It may be that the 4f electrons come into play in these syntheses. Gschneidner and Valletta<sup>20</sup> have recently discussed the possibility that 4f electrons participate in bonding in the lighter lanthanide elements and compounds.

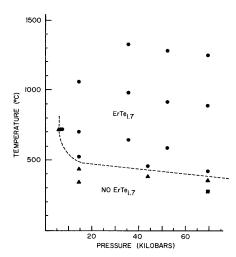


Figure 2.—Pressure-temperature synthesis diagram for  $\operatorname{ErTe}_{2-x}(x \approx 0.3)$ : circles,  $\operatorname{ErTe}_{2-x}$  formation; triangles, reaction but no  $\operatorname{ErTe}_{2-x}$  formation; square, no reaction.

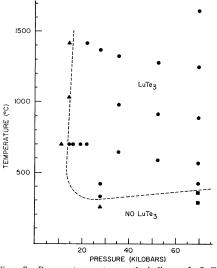


Figure 3.—Pressure-temperature synthesis diagram for LuTe<sub>3</sub>: circles, LuTe<sub>3</sub> formation; triangles, reaction but no LuTe<sub>3</sub> formation; squares, no reaction.

They suggest that 4f bonding is responsible for subtle changes in atomic arrangements that occur on progressing through the series of lanthanide metals. They also suggest that 4f influence is present in some lanthanide compounds and point

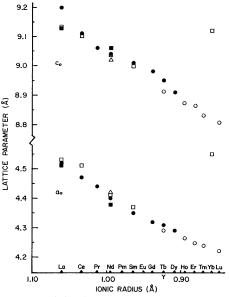


Figure 4.—Variation of lattice parameters with ionic radius for the  $LTe_{2-x}$  compounds: filled circles, M. P. Pardo, J. Flahaut, and L. Domange, *Bull. Soc. Chim. Fr.*, 3267 (1964); filled squares, R. Wang, H. Steinfink, and W. F. Bradley, *Inorg. Chem.*, **5**, 142 (1966); open squares, R. Wang, Ph.D. Dissertation, The University of Texas, 1967; open triangles, W. Lin, H. Steinfink, and E. J. Weiss, *Inorg. Chem.*, **4**, 877 (1965); open circles, present work.

Table II					
Minimum Pressures and Temperatures					
for Syntheses of LTe <sub>2-x</sub> Compounds					
	Minimum				
	pressure Minimum				
		required for	temp required		
		syntheses of	for synthesis		
	L <sup>2+</sup> ionic	LTe <sub>2-x</sub> at 700°,	of LTe <sub>2-x</sub> at 69		
L	radius, <sup>a</sup> Å	kbars	kbars, °C		
Y	0.923	3	425		
Но	0.894	3	360		
Er	0.881	7	425		
Tm	0.869	10	425		
Lu	0.848	26	495		

<sup>a</sup> D. H Templeton and C. H. Dauben, *J. Amer. Chem. Soc.*, **76**, 5237 (1954).

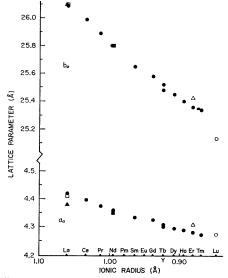


Figure 5.—Variation of lattice parameters with ionic radius for the LTe<sub>5</sub> compounds: filled circles, M. P. Pardo, O. Gorochov, J. Flahaut, and L. Domange C. R. Acad. Sci., **260**, 1666 (1965); filled squares, B. K. Norling and H. Steinfink, Inorg. Chem., **5**, 1488 (1966); filled triangles, W. Lin, H. Steinfink, and E. J. Weiss, *ibid.*, **4**, 877 (1965); open squares, T. H. Ramsey, H. Steinfink, and E. J. Weiss, *ibid.*, **4**, 1154 (1965); open triangles, D. J. Haase, H. Steinfink, and E. J. Weiss, *ibid.*, **4**, 541 (1965); open circles, present work.

Table III

Lattice Parameters					
Compound	Unit cell	$a_0, \mathrm{\AA}$	$b_0, \mathrm{\AA}$	$c_0, \text{\AA}$	
YTe <sub>2-x</sub>	Tetragonal	4.291±0.003	4.291±0.003	8.912±0.006	
HoTe <sub>2-x</sub>	Tetragonal	$4.264 \pm 0.002$	$4.264 \pm 0.002$	$8.872 \pm 0.004$	
ErTe <sub>2-x</sub>	Tetragonal	4.248±0.002	$4.248 \pm 0.002$	$8.865 \pm 0.005$	
TmTe <sub>2-x</sub>	Tetragonal	4.240±0.002	4.241±0.002	8.831±0.004	
LuTe <sub>2-x</sub>	Tetragonal	4.222±0.001	4.222±0.001	8.807±0.003	
LuTe <sub>3</sub>	Ortho-	4.277±0.001	25.137±0.00	$4.278 \pm 0.001$	
	rhombic		6		

out the important role pressure could have in influencing 4f bonding. In this connection, they propose a test for determining whether or not 4f electrons are contributing to the bonding in a series of lanthanide compounds wherein pressure determines which of two polymorphs will form. If (at constant temperature) increasing pressure is required with increasing atomic number to form one of the polymorphs, then 4f electrons are contributing to the bonding. If increasing pressure is required with decreasing atomic number, then 4f bonding is not involved. The data in Table II show that the pressure requirement for synthesis varies directly with atomic number. In this case, the boundary exists between the compound and the elements, but this should have the same significance with respect to 4f bonding as a phrase boundary between two polymorphs. Since increasing pressure is required to form LTe<sub>2-x</sub> from the elements with increasing atomic number, it is likely that pressure is causing the 4f electrons of these heavier lanthanides to participate and , in effect, behave more like the higher lanthanides.

Each of the new LTe2-x compounds is silvery in appearance whereas LuTe<sub>3</sub> is goldcolored. Both types of compounds are unstable with respect to the elements. X-ray spectra of HoTe<sub>2-x</sub> show no decomposition after 15 days but complete decomposition after 80 days. When heated under vacuum, HoTe2-x remained stable at 260° but decomposed at 340°. The shiny goldcolored LuTe<sub>3</sub> was observed to lose its gold color after about 5-8 min. Complete decomposition occurred within 2 or 3 days. These compounds were stored in slip-capped plastic vials in the open atmosphere.

Scientists at the Battelle Memorial Institute, Columbus, Ohio, have been investigating the semiconducting properties of lanthanide metals and compounds.<sup>21,22,23,24</sup> Some of the  $LTe_{2-x}$ compounds (as well as other lanthanidetellurium compounds) are included in their study. Although no study of the semiconducting properties of these new  $LTe_{2-x}$  compounds has been made, it is expected that their properties will be similar to those of the previously known analogs.

X-Ray studies have shown these new compounds to be isostructural with their lower molecular weight analogs. The points in Figures 4 and 5 show that the variation of lattice parameters *vs.* ionic radius follow the pattern set by the previously known analogous compounds. Lattice parameters are shown in Table III. X-Ray powder data are given in Table IV.

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	YТ	<b>'</b> A.	
hkl	D <sub>hkl</sub> <sup>(Å)</sup>	d <sub>hkl</sub> <sup>(Å)</sup>	I <sub>obs</sub>
IIKI	(observed)	(calculate	
012	3.067	3.091	25
110	3.006	3.035	15
003	2.944	2.971	50
111	2.852	2.873	100
012	2.494	2.508	100
013	2.434	2.443	90
020	2.145	2.146	45
114	1.791	1.796	30
212	1.762	1.763	10
023	1.734	1.739	40
015	1.642	1.646	30
123	1.611	1.612	30 40
220	1.516	1.517	30
016	1.400	1.404	35
223	1.350	1.351	30
116	1.334	1.334	15
215	1.305	1.306	35
132	1.294	1.298	15
126	1.174	1.175	05
035	1.113	1.116	30
323	1.105	1.105	05
315	1.078	1.081	15
040	1.069	1.073	10
306	1.030	1.030	05
235	0.989	0.990	10
218	0.964	0.964	35
240	0.959	0.960	15
119	0.941	0.941	10
236	0.930	0.929	15
	0.930		
243		0.913	25
415	0.898	0.899	10
228		0.898	
416	0.885	0.852	25
	Tm	Te <sub>2-x</sub>	
hkl	$D_{hkl}^{(A)}$	$d_{hkl}^{(A)}$	Iobs
hkl	D <sub>hkl</sub> <sup>(A)</sup> (observed)	d <sub>hkl</sub> <sup>(Å)</sup> (calculat	I <sub>obs</sub>
	(observed)	(calculat	ed)
012	(observed) 3.048	(calculat 3.058	ed) 50
$\begin{array}{c} 0 \ 1 \ 2 \\ 1 \ 1 \ 0 \end{array}$	(observed) 3.048 2.988	(calculat 3.058 2.998	ed) 50 30
0 1 2 1 1 0 0 0 3	(observed) 3.048 2.988 2.930	(calculat 3.058 2.998 2.944	ed) 50 30 60
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \end{array}$	(observed) 3.048 2.988 2.930 2.829	(calculat 3.058 2.998 2.944 2.839	red) 50 30 60 100
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470	(calculat 3.058 2.998 2.944 2.839 2.480	red) 50 30 60 100 90
0 1 2 1 1 0 0 0 3 1 1 1 1 1 2 0 1 3	(observed) 3.048 2.988 2.930 2.829 2.470 2.408	(calculat 3.058 2.998 2.944 2.839 2.480 2.418	ed) 50 30 60 100 90 100
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470	(calculat 3.058 2.998 2.944 2.839 2.480	red) 50 30 60 100 90
0 1 2 1 1 0 0 0 3 1 1 1 1 1 2 0 1 3	(observed) 3.048 2.988 2.930 2.829 2.470 2.408	(calculat 3.058 2.998 2.944 2.839 2.480 2.418	ed) 50 30 60 100 90 100
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778	ed) 50 30 60 100 90 100 50 10
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742	ed) 50 30 60 100 90 100 50 10 20
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820	ed) 50 30 60 100 90 100 50 10 20 30
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630	ed) 50 30 60 100 90 100 50 10 20 30 50
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594	ed) 50 30 60 100 90 100 50 10 20 30 50 45
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.776 1.717 1.627 1.592 1.499 1.390 1.339 1.323	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15 30
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.339 1.323 1.292	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.776 1.717 1.627 1.592 1.499 1.390 1.339 1.323	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15 30
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.339 1.323 1.292	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.336 1.321 1.292	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15 30 35
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 1 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 \\ 1 & 2 & 6 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339 1.323 1.292 1.283 1.163	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.391 1.336 1.321 1.292 1.283 1.163	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15 30 35 15 35
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 \\ 1 & 2 & 6 \\ 0 & 3 & 5 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339 1.323 1.292 1.283 1.163 1.104	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 45 10 40 15 30 35 15 35 20
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 \\ 1 & 2 & 6 \\ 0 & 3 & 5 \\ 3 & 2 & 3 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.339 1.339 1.323 1.292 1.283 1.163 1.104 1.092	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104 1.092	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 45 10 40 15 30 35 15 35 20 15
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 3 \\ 0 & 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 0 & 3 & 5 \\ 1 & 2 & 1 & 5 \\ 1 & 3 & 2 \\ 1 & 2 & 6 \\ 0 & 3 & 5 \\ 3 & 1 & 5 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339 1.323 1.292 1.283 1.163 1.104 1.092 1.068	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104 1.092 1.068	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 45 10 40 15 35 20 15 10
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 3 & 2 \\ 1 & 2 & 6 \\ 0 & 3 & 5 \\ 3 & 2 & 3 \\ 1 & 5 \\ 1 & 2 & 6 \\ 0 & 3 & 5 \\ 3 & 1 & 5 \\ 0 & 4 & 0 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339 1.323 1.292 1.283 1.163 1.104 1.092 1.068 1.060	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104 1.092 1.068 1.060	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15 30 35 15 35 20 15 10 05
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \\ 2 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \\ 2 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 &$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339 1.323 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15 35 20 15 15 15 15 15 15 15
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 & 3 \\ 3 & 1 & 5 \\ 0 & 3 & 0 & 6 \\ 2 & 3 & 5 \\ \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339 1.323 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 45 10 40 15 35 20 15 10 05 15 30
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \\ 2 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \\ 2 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 &$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339 1.323 1.292 1.283 1.163 1.104 1.092 1.068 1.066 1.019	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15 35 20 15 15 15 15 15 15 15
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 & 3 \\ 3 & 1 & 5 \\ 0 & 3 & 0 & 6 \\ 2 & 3 & 5 \\ \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.339 1.339 1.323 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979 0.954	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979 0.954	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 45 10 45 10 45 10 45 10 50 15 30 30 20 20 20 30 50 15 30 20 20 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 45 10 45 10 45 15 35 20 15 35 20 35 15 35 20 35 15 35 20 20 30 35 15 35 20 20 30 35 15 35 20 20 30 35 15 35 20 20 35 15 35 20 20 35 15 35 20 20 35 15 35 20 20 35 15 35 20 20 20 35 15 35 20 20 20 35 15 35 20 20 20 20 20 35 15 35 20 20 20 20 20 20 20 20 20 20
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 0 & 3 & 5 \\ 3 & 2 & 3 \\ 1 & 5 \\ 0 & 4 & 0 \\ 3 & 0 & 6 \\ 2 & 3 & 5 \\ 2 & 1 & 8 \\ 2 & 4 & 0 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339 1.323 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979 0.954 0.947	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.954 0.948	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15 30 35 15 35 20 15 10 05 15 30 20 20 20 20 20 20 20 20 20 2
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 2 \\ 1 & 2 & 6 \\ 0 & 3 & 5 \\ 3 & 2 & 3 \\ 3 & 1 & 5 \\ 1 & 3 & 2 \\ 1 & 2 & 6 \\ 0 & 3 & 5 \\ 3 & 2 & 3 \\ 3 & 1 & 6 \\ 2 & 3 & 5 \\ 2 & 1 & 8 \\ 2 & 4 & 0 \\ 1 & 1 & 9 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339 1.323 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979 0.954 0.947 0.933	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979 0.954 0.948 0.933	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15 30 35 15 30 15 10 05 15 30 20 20 20 20 20 20 20 20 20 2
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$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 3 & 5 \\ 2 & 1 & 8 \\ 2 & 4 & 0 \\ 1 & 1 & 9 \\ 2 & 3 & 6 \\ 2 & 4 & 3 \\ 4 & 1 & 5 \\ 2 & 4 & 1 & 6 \\ \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339 1.323 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979 0.954 0.947 0.933 0.920 0.902	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979 0.954 0.948 0.933 0.919 0.902 0.889	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15 30 35 15 10 05 15 30 20 20 20 20 15 20
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 0 & 3 & 5 \\ 3 & 2 & 3 \\ 1 & 1 & 6 \\ 0 & 3 & 5 \\ 3 & 1 & 5 \\ 1 & 2 & 6 \\ 2 & 4 & 0 \\ 1 & 1 & 9 \\ 2 & 3 & 6 \\ 2 & 4 & 5 \\ 2 & 2 & 8 \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339 1.323 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979 0.954 0.947 0.933 0.920 0.902 0.889	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.954 0.948 0.933 0.919 0.902 0.889 0.889	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15 30 35 15 35 20 15 10 05 15 30 20 20 20 20 20 20 30 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 20 30 50 10 45 10 45 10 45 10 45 10 45 10 40 15 30 35 15 35 20 20 15 30 20 20 30 50 15 30 20 30 20 30 50 15 35 20 15 30 20 35 15 35 20 20 20 30 20 35 15 35 20 20 20 35 15 30 20 20 20 20 20 20 20 20 20 2
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 3 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 3 & 5 \\ 2 & 1 & 8 \\ 2 & 4 & 0 \\ 1 & 1 & 9 \\ 2 & 3 & 6 \\ 2 & 4 & 3 \\ 4 & 1 & 5 \\ 2 & 4 & 1 & 6 \\ \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339 1.323 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979 0.954 0.947 0.933 0.920 0.902 0.889 0.844	(calculat 3.058 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979 0.954 0.948 0.933 0.919 0.902 0.889 0.843	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 40 15 30 35 15 30 20 20 20 20 20 20 30 20 20 20 20 20 20 20 20 20 2
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 3 \\ 0 & 1 & 1 & 4 \\ 2 & 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 3 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 5 \\ 2 & 1 & 8 \\ 2 & 4 & 0 \\ 1 & 1 & 9 \\ 2 & 4 & 3 \\ 4 & 1 & 5 \\ 2 & 2 & 8 \\ 4 & 1 & 5 \\ 2 & 2 & 8 \\ 5 & 1 & 2 \\ \end{array}$	(observed) 3.048 2.988 2.930 2.829 2.470 2.408 2.116 1.776 1.745 1.717 1.627 1.592 1.499 1.390 1.339 1.323 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979 0.954 0.947 0.933 0.920 0.902 0.889 0.844 0.818	(calculat 3.058 2.998 2.944 2.839 2.480 2.418 2.120 1.778 1.742 1.820 1.630 1.594 1.499 1.391 1.336 1.321 1.292 1.283 1.163 1.104 1.092 1.068 1.060 1.019 0.979 0.954 0.948 0.933 0.919 0.902 0.889 0.843 0.817	ed) 50 30 60 100 90 100 50 10 20 30 50 45 10 45 10 45 10 45 10 45 10 50 15 35 20 15 10 55 15 30 20 20 20 20 20 20 20 20 20 2

Table IV X-Ray Powder Data for the New Compounds						
	Ho	Ге <sub>2-х</sub>				
hkl	$\mathbf{D}_{hkl}^{(\hat{A})}$	d <sub>hkl</sub> <sup>(Å)</sup>	I <sub>obs</sub>			
	(observed)	(calculat				
012	3.044	3.074	35			
110	2.996	3.015	45			
003	2.938	2.957	50			
111	2.833	2.855	100			
012	2.480	2.494	95			
013	2.415	2.460	90			
020	2.123	2.132	70			
114	1.779	1.787	20			
212	1.745	1.752	25			
023	1.722	1.729	35			
015	1.633	1.638	30			
123	1.298	1.603	55			
220	1.503	1.507	25			
016	1.394	1.397	25			
223	1.344	1.343	20			
116	1.327	1.328	20			
215	1.297	1.299	30			
132	1.289	1.290	15			
126	1.168	1.169	35			
035	1.109	1.109	20			
323	1.098	1.098	20			
315	1.076	1.074	10			
040	1.067	1.066	10			
306	1.025	1.025	15			
235	0.984	0.984	30			
218	0.959	0.959	20			
240	0.956	0.953	15			
119	0.937	0.937	20			
236	0.924	0.924	20			
243	0.908	0.907	10			
415	0.894	0.893	25			
228	0.840	0.893	25			
416	0.849	0.849	25 20			
512 238	0.820 0.808	0.822 0.809	20 15			
139	0.808	0.809	20			
139	0.797	0.790	20			

	Lu	Ге <sub>2-х</sub>	
hkl	D <sub>hkl</sub> <sup>(Å)</sup>	d <sub>hkl</sub> <sup>(Å)</sup>	I <sub>obs</sub>
012	(observed) 3.026	(calculat 3.048	
110	2.975	2.986	20 30
003	2.918	2.936	50
111	2.818	2.828	70
112	2.467	2.471	80
$     \begin{array}{r}       0 & 1 & 3 \\       0 & 2 & 0     \end{array} $	2.403	2.410	100 45
114	2.108 1.764	2.111 1.772	43 15
212	1.733	1.735	15
023	1.712	1.714	30
015	1.625	1.626	40
123 220	1.587	1.588	35
016	1.492 1.384	1.493 1.387	20 30
223	1.333	1.331	25
116	1.317	1.317	25
215	1.287	1.288	30
132 126	1.276	1.278	20 30
035	1.159 1.100	1.159 1.100	25
323	1.089	1.088	15
315	1.064	1.064	15
040	1.055	1.056	15
306	1.016	1.016	25
$\begin{array}{c}235\\218\end{array}$	0.976 0.951	0.975 0.951	35 20
240	0.942	0.944	15
119	0.930	0.930	30
236	0.916	0.915	20
243	0.900	0.899	05
415 228	0.886	$0.885 \\ 0.886$	35
416	0.840	0.880	20
512	0.814	0.814	25
238	0.801	0.802	20
139	0.790	0.789	30
	ErT	Te <sub>2-x</sub>	
hkl	D <sub>hkl</sub> <sup>(A)</sup>	$\frac{\int e_{2-x}}{d_{hkl}}$	Iobs
	D <sub>hkl</sub> <sup>(Å)</sup> (observed)	d <sub>hkl</sub> <sup>(A)</sup> (calculat	ed)
012	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.067	ed) 40
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.067 3.004	ed) 40 35
012	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.067	ed) 40
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.067 3.004 2.955 2.845 2.487	ed) 40 35 25 100 50
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \end{array}$	D <sub>hkl</sub> <sup>(Å)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.067 3.004 2.955 2.845 2.487 2.426	ed) 40 35 25 100 50 50
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \end{array}$	D <sub>hkl</sub> <sup>(Å)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.067 3.004 2.955 2.845 2.487 2.426 2.124	ed) 40 35 25 100 50 50 80
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \end{array}$	D <sub>hkl</sub> <sup>(Å)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779	d <sub>hki</sub> <sup>(Å)</sup> (calculat 3.067 3.004 2.955 2.845 2.487 2.426 2.124 1.793	ed) 40 35 25 100 50 50 80 05
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \end{array}$	D <sub>hkl</sub> <sup>(Å)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.067 3.004 2.955 2.845 2.487 2.426 2.124	ed) 40 35 25 100 50 50 80
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635	d <sub>hkl</sub> <sup>(Å)</sup> (calculat 3.067 3.004 2.955 2.845 2.487 2.426 2.124 1.793 1.746 1.725 1.636	ed) 40 35 25 100 50 50 80 05 35 35 30
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.067 3.004 2.955 2.845 2.487 2.426 2.124 1.793 1.746 1.725 1.636 1.598	ed) 40 35 25 100 50 50 80 05 35 35 30 50
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504	$\begin{array}{c} d_{ikl}{}^{(\lambda)} \\ (calculat\\ 3.067\\ 3.004\\ 2.955\\ 2.845\\ 2.487\\ 2.426\\ 2.124\\ 1.793\\ 1.746\\ 1.725\\ 1.636\\ 1.598\\ 1.502 \end{array}$	ed) 40 35 25 100 50 50 80 05 35 35 30 50 20
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.007 2.955 2.845 2.487 2.426 2.124 1.793 1.746 1.725 1.636 1.598 1.502	ed) 40 35 25 100 50 50 80 05 35 35 30 50 20 30
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504	$\begin{array}{c} d_{ikl}{}^{(\lambda)}\\ (calculat\\ 3.067\\ 3.004\\ 2.955\\ 2.845\\ 2.487\\ 2.426\\ 2.124\\ 1.793\\ 1.746\\ 1.725\\ 1.636\\ 1.598\\ 1.502 \end{array}$	ed) 40 35 25 100 50 50 80 05 35 35 30 50 20
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395 1.339 1.330 1.295	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.067 2.955 2.845 2.426 2.124 1.793 1.746 1.725 1.636 1.598 1.502 1.339 1.326 1.296	ed) 40 35 25 100 50 50 80 05 35 35 30 50 20 30 10 30 30 30
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 \\ 1 & 0 & 1 \\ 2 & 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395 1.339 1.330 1.295 1.285	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.007 2.955 2.845 2.487 2.426 2.124 1.793 1.746 1.725 1.636 1.598 1.502 1.396 1.3296 1.3296 1.286	ed) 40 35 25 100 50 50 80 05 35 35 35 30 50 20 30 10 30 10 10
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 3 \\ 0 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395 1.339 1.330 1.295 1.285 1.166	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.007 2.955 2.845 2.487 2.426 2.124 1.793 1.746 1.725 1.636 1.598 1.502 1.396 1.339 1.326 1.296 1.286 1.166	ed) 40 35 25 100 50 50 80 05 35 35 30 50 20 30 10 30 10 10 10 10
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 0 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 \\ 1 & 2 & 6 \\ 0 & 3 & 5 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.747 1.747 1.747 1.747 1.735 1.596 1.504 1.339 1.330 1.295 1.285 1.166 1.108	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.067 2.955 2.845 2.485 2.426 2.124 1.793 1.746 1.725 1.636 1.598 1.502 1.396 1.339 1.326 1.296 1.296 1.166 1.106	ed) 40 35 25 100 50 50 80 05 35 35 30 50 20 30 10 30 10 10 25
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 2 & 6 \\ \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395 1.339 1.330 1.295 1.285 1.166	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.007 2.955 2.845 2.487 2.426 2.124 1.793 1.746 1.725 1.636 1.598 1.502 1.396 1.339 1.326 1.296 1.286 1.166	ed) 40 35 25 100 50 50 80 05 35 35 30 50 20 30 10 30 10 10 10 10
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 3 \\ 0 & 1 & 1 & 4 \\ 2 & 1 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 & 3 \\ 1 & 1 & 4 \\ 2 & 2 & 3 \\ 1 & 1 & 4 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 \\ 1 & 2 & 6 \\ 0 & 3 & 5 \\ 3 & 2 & 3 \\ 3 & 1 & 5 \\ 0 & 4 & 0 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395 1.339 1.330 1.295 1.285 1.166 1.108 1.094 1.075 1.063	$\begin{array}{c} d_{hkl}{}^{(\lambda)} \\ (calculat \\ 3.067 \\ 2.955 \\ 2.845 \\ 2.426 \\ 2.426 \\ 2.124 \\ 1.793 \\ 1.746 \\ 1.725 \\ 1.636 \\ 1.598 \\ 1.502 \\ 1.339 \\ 1.326 \\ 1.339 \\ 1.326 \\ 1.296 \\ 1.286 \\ 1.106 \\ 1.094 \end{array}$	ed) 40 35 25 100 50 50 80 05 35 35 30 50 20 30 10 30 30 10 10 25 15 15 05
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 2 & 6 \\ 0 & 3 & 5 \\ 3 & 2 & 3 \\ 3 & 1 & 5 \\ 3 & 2 & 3 \\ 3 & 1 & 5 \\ 0 & 4 & 0 \\ 3 & 0 & 6 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395 1.339 1.330 1.295 1.285 1.166 1.108 1.094 1.075 1.063 1.023	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.007 3.004 2.955 2.845 2.487 2.426 1.793 1.746 1.725 1.636 1.598 1.502 1.396 1.399 1.326 1.296 1.286 1.106 1.006 1.0071 1.063 1.022	ed) 40 35 25 100 50 50 80 05 35 35 30 50 20 30 10 30 10 10 25 15 15 05 05
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 0 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 &$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395 1.330 1.295 1.285 1.285 1.166 1.108 1.094 1.075 1.063 1.023 0.982	$\begin{array}{c} d_{hkl}{}^{(\lambda)} \\ (calculat \\ 3.067 \\ 2.955 \\ 2.845 \\ 2.426 \\ 2.124 \\ 1.793 \\ 1.746 \\ 1.725 \\ 1.636 \\ 1.598 \\ 1.502 \\ 1.339 \\ 1.326 \\ 1.296 \\ 1.286 \\ 1.106 \\ 1.094 \\ 1.071 \\ 1.061 \\ 1.022 \\ 0.981 \end{array}$	ed) 40 35 25 100 50 50 80 05 35 35 35 30 50 20 30 10 30 30 10 10 25 15 15 15 05 05 10
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 \\ 1 & 2 & 6 \\ 0 & 3 & 5 \\ 3 & 2 & 3 \\ 3 & 1 & 5 \\ 0 & 4 & 0 \\ 3 & 0 & 6 \\ 2 & 3 & 5 \\ 2 & 1 & 8 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395 1.339 1.330 1.295 1.285 1.166 1.108 1.094 1.075 1.063 1.023 0.982 0.957	$\begin{array}{c} d_{hkl}{}^{(\lambda)} \\ (calculat \\ 3.067 \\ 2.955 \\ 2.845 \\ 2.426 \\ 2.124 \\ 1.793 \\ 1.746 \\ 1.725 \\ 1.636 \\ 1.598 \\ 1.502 \\ 1.339 \\ 1.326 \\ 1.296 \\ 1.339 \\ 1.326 \\ 1.286 \\ 1.106 \\ 1.004 \\ 1.071 \\ 1.063 \\ 1.022 \\ 0.981 \\ 0.957 \end{array}$	ed) 40 35 25 100 50 50 80 05 35 35 30 50 20 30 10 10 25 15 15 15 05 05 10 20
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 1 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 0 & 3 & 5 \\ 3 & 2 & 3 \\ 3 & 1 & 5 \\ 0 & 4 & 0 \\ 3 & 0 & 6 \\ 2 & 3 & 5 \\ 2 & 1 & 8 \\ 2 & 4 & 0 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395 1.339 1.339 1.339 1.339 1.339 1.339 1.295 1.285 1.166 1.108 1.094 1.075 1.063 1.023 0.982 0.957 0.949	d <sub>hkl</sub> <sup>(A)</sup> (calculat 3.007 2.955 2.845 2.487 2.426 1.793 1.746 1.725 1.636 1.598 1.502 1.396 1.396 1.326 1.296 1.296 1.296 1.296 1.296 1.296 1.296 1.094 1.071 1.063 1.022 0.957 0.950	ed) 40 35 40 35 25 100 50 50 80 05 35 35 30 50 20 30 10 30 30 10 10 25 15 15 15 05 05 10 20 10 10 10 10 10 10 15 15 15 15 15 15 15 15 15 15 15 15 15
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 \\ 1 & 2 & 6 \\ 0 & 3 & 5 \\ 3 & 2 & 3 \\ 3 & 1 & 5 \\ 0 & 4 & 0 \\ 3 & 0 & 6 \\ 2 & 3 & 5 \\ 2 & 1 & 8 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395 1.339 1.330 1.295 1.285 1.166 1.108 1.094 1.075 1.063 1.023 0.982 0.957	$\begin{array}{c} d_{hkl}{}^{(\lambda)} \\ (calculat \\ 3.067 \\ 2.955 \\ 2.845 \\ 2.426 \\ 2.124 \\ 1.793 \\ 1.746 \\ 1.725 \\ 1.636 \\ 1.598 \\ 1.502 \\ 1.339 \\ 1.326 \\ 1.296 \\ 1.339 \\ 1.326 \\ 1.296 \\ 1.286 \\ 1.106 \\ 1.004 \\ 1.071 \\ 1.063 \\ 1.022 \\ 0.981 \\ 0.957 \end{array}$	ed) 40 35 25 100 50 50 80 05 35 35 30 50 20 30 10 10 25 15 15 15 05 05 10 20
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 5 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 2 & 1 & 5 \\ 1 & 3 & 2 \\ 1 & 2 & 6 \\ 2 & 3 & 5 \\ 2 & 1 & 8 \\ 2 & 4 & 0 \\ 1 & 1 & 9 \\ 2 & 3 & 6 \\ 2 & 4 & 3 \\ \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395 1.330 1.295 1.285 1.166 1.108 1.094 1.075 1.063 1.023 0.982 0.957 0.949 0.921 0.905	$\begin{array}{c} d_{hkl}{}^{(\lambda)} \\ (calculat \\ 3.067 \\ 2.955 \\ 2.845 \\ 2.426 \\ 2.426 \\ 2.124 \\ 1.793 \\ 1.746 \\ 1.725 \\ 1.636 \\ 1.598 \\ 1.502 \\ 1.339 \\ 1.326 \\ 1.296 \\ 1.339 \\ 1.326 \\ 1.286 \\ 1.106 \\ 1.094 \\ 1.071 \\ 1.063 \\ 1.022 \\ 0.981 \\ 0.957 \\ 0.950 \\ 0.921 \\ 0.904 \end{array}$	ed) 40 35 25 100 50 50 80 05 35 35 30 20 30 10 30 30 10 10 25 15 15 15 05 05 10 20 10 20 10 20 10 20 15 20 15 20 15 20 15 20 15 20 15 20 20 20 20 20 20 20 20 20 20 20 20 20
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 1 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 1 & 6 \\ 0 & 3 & 5 \\ 2 & 1 & 2 \\ 1 & 2 & 6 \\ 0 & 3 & 0 & 6 \\ 2 & 3 & 5 \\ 2 & 1 & 8 \\ 2 & 4 & 0 \\ 1 & 1 & 9 \\ 2 & 3 & 6 \\ 2 & 4 & 3 \\ 4 & 1 & 5 \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395 1.339 1.330 1.295 1.285 1.166 1.108 1.094 1.075 1.063 1.023 0.982 0.957 0.949 0.936 0.921	d <sub>nkl</sub> <sup>(A)</sup> (calculat 3.067 2.955 2.845 2.487 2.426 1.793 1.746 1.725 1.636 1.598 1.502 1.396 1.396 1.396 1.326 1.296 1.286 1.106 1.094 1.071 1.063 1.029 1.094 0.957 0.950 0.921 0.904 0.891	ed) 40 35 45 100 50 50 80 05 35 35 30 50 20 30 10 30 10 10 25 15 15 15 15 05 05 10 20 10 20 10 20 15 15 15 15 15 15 15 15 15 15 15 15 15
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 3 \\ 0 & 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 1 & 1 & 4 \\ 2 & 1 & 2 & 3 \\ 0 & 1 & 1 & 4 \\ 2 & 2 & 3 & 1 & 1 \\ 1 & 2 & 3 & 2 \\ 0 & 1 & 1 & 6 \\ 0 & 3 & 5 & 3 & 2 & 3 \\ 1 & 1 & 6 & 0 & 3 \\ 1 & 1 & 2 & 3 & 1 \\ 1 & 2 & 3 & 6 \\ 2 & 4 & 3 & 1 & 5 \\ 2 & 1 & 8 & 2 & 4 \\ 1 & 1 & 9 & 2 & 3 & 6 \\ 2 & 4 & 3 & 4 & 1 & 5 \\ 2 & 2 & 8 & 1 \\ 1 & 1 & 2 & 2 & 8 \end{array}$	$\begin{array}{c} D_{hkl}^{(\lambda)} \\ (observed) \\ 3.052 \\ 2.992 \\ 2.946 \\ 2.840 \\ 2.479 \\ 2.422 \\ 2.124 \\ 1.779 \\ 1.747 \\ 1.721 \\ 1.635 \\ 1.596 \\ 1.504 \\ 1.395 \\ 1.339 \\ 1.339 \\ 1.339 \\ 1.339 \\ 1.330 \\ 1.295 \\ 1.285 \\ 1.166 \\ 1.108 \\ 1.094 \\ 1.075 \\ 1.063 \\ 1.023 \\ 0.982 \\ 0.957 \\ 0.949 \\ 0.936 \\ 0.921 \\ 0.905 \\ 0.892 \end{array}$	$\begin{array}{c} d_{hkl}{}^{(\lambda)} \\ (calculat \\ 3.067 \\ 3.004 \\ 2.955 \\ 2.845 \\ 2.487 \\ 2.426 \\ 1.793 \\ 1.746 \\ 1.725 \\ 1.636 \\ 1.598 \\ 1.502 \\ 1.396 \\ 1.396 \\ 1.396 \\ 1.296 \\ 1.296 \\ 1.286 \\ 1.166 \\ 1.094 \\ 1.071 \\ 1.063 \\ 1.022 \\ 0.941 \\ 0.957 \\ 0.950 \\ 0.936 \\ 0.921 \\ 0.901 \\ 0.891 \\ 0.892 \end{array}$	ed) 40 35 40 35 25 100 50 50 80 05 35 35 30 50 20 30 10 30 10 10 25 15 15 05 15 15 05 10 20 10 20 10 20 15 20 10 20 10 20 15 20 10 20 10 20 15 20 10 20 10 20 15 20 10 20 20 10 20 20 20 20 20 20 20 20 20 20 20 20 20
$\begin{array}{c} 0 \ 1 \ 2 \\ 1 \ 1 \ 0 \\ 0 \ 0 \ 3 \\ 1 \ 1 \ 1 \\ 0 \ 1 \ 2 \\ 0 \ 2 \ 3 \\ 0 \ 2 \ 0 \\ 1 \ 4 \\ 2 \ 1 \ 2 \\ 0 \ 2 \ 3 \\ 0 \ 1 \ 5 \\ 1 \ 2 \ 3 \\ 0 \ 1 \ 5 \\ 1 \ 2 \ 3 \\ 2 \ 1 \ 5 \\ 1 \ 2 \ 3 \\ 1 \ 1 \ 6 \\ 0 \ 3 \ 5 \\ 3 \ 2 \ 3 \\ 1 \ 5 \\ 1 \ 2 \ 6 \\ 0 \ 3 \ 5 \\ 2 \ 1 \ 8 \\ 2 \ 4 \ 0 \\ 1 \ 1 \ 9 \\ 2 \ 3 \ 6 \\ 2 \ 4 \ 3 \\ 4 \ 1 \ 5 \\ 2 \ 4 \ 3 \\ 4 \ 1 \ 6 \\ 1 \ 6 \\ 4 \ 1 \ 6 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.339 1.330 1.295 1.285 1.166 1.108 1.094 1.075 1.063 1.023 0.982 0.957 0.949 0.936 0.921 0.905 0.892	d <sub>nkl</sub> <sup>(A)</sup> (calculat 3.067 2.955 2.845 2.485 2.426 2.124 1.793 1.746 1.725 1.636 1.598 1.502 1.396 1.339 1.326 1.296 1.339 1.326 1.296 1.296 1.296 1.106 1.106 1.094 1.004 1.022 0.981 0.957 0.957 0.936 0.921 0.936 0.921 0.994 0.892 0.845	ed) 40 35 40 35 25 100 50 50 80 05 35 35 30 50 20 30 10 30 10 10 20 15 15 15 05 05 10 20 10 20 10 20 15 20 10 20 10 20 15 20 10 20 20 20 20 20 20 20 20 20 20 20 20 20
$\begin{array}{c} 0 \ 1 \ 2 \\ 1 \ 1 \ 0 \\ 0 \ 0 \ 3 \\ 1 \ 1 \ 1 \\ 0 \ 1 \ 2 \\ 0 \ 1 \ 3 \\ 0 \ 2 \\ 0 \ 1 \ 3 \\ 0 \ 1 \ 1 \\ 2 \ 1 \ 2 \\ 0 \ 2 \ 3 \\ 1 \ 1 \ 6 \\ 2 \ 2 \ 3 \\ 1 \ 1 \ 6 \\ 2 \ 2 \ 3 \\ 1 \ 1 \ 6 \\ 0 \ 3 \ 5 \\ 2 \ 1 \ 5 \\ 1 \ 2 \ 3 \\ 2 \ 4 \ 0 \\ 1 \ 1 \ 9 \\ 2 \ 3 \ 6 \\ 2 \ 4 \ 3 \\ 4 \ 1 \ 5 \\ 2 \ 2 \ 8 \end{array}$	$\begin{array}{c} D_{hkl}^{(\Lambda)} \\ (observed) \\ 3.052 \\ 2.992 \\ 2.946 \\ 2.840 \\ 2.479 \\ 2.422 \\ 2.124 \\ 1.779 \\ 1.747 \\ 1.721 \\ 1.635 \\ 1.596 \\ 1.504 \\ 1.395 \\ 1.339 \\ 1.339 \\ 1.339 \\ 1.339 \\ 1.330 \\ 1.295 \\ 1.285 \\ 1.166 \\ 1.108 \\ 1.094 \\ 1.075 \\ 1.063 \\ 1.023 \\ 0.982 \\ 0.957 \\ 0.949 \\ 0.936 \\ 0.921 \\ 0.905 \\ 0.892 \end{array}$	$\begin{array}{c} d_{hkl}{}^{(\lambda)} \\ (calculat \\ 3.067 \\ 3.004 \\ 2.955 \\ 2.845 \\ 2.487 \\ 2.426 \\ 1.793 \\ 1.746 \\ 1.725 \\ 1.636 \\ 1.598 \\ 1.502 \\ 1.396 \\ 1.396 \\ 1.396 \\ 1.296 \\ 1.296 \\ 1.286 \\ 1.166 \\ 1.094 \\ 1.071 \\ 1.063 \\ 1.022 \\ 0.941 \\ 0.957 \\ 0.950 \\ 0.936 \\ 0.921 \\ 0.901 \\ 0.891 \\ 0.892 \end{array}$	ed) 40 35 40 35 25 100 50 50 80 05 35 35 30 50 20 30 10 30 10 10 25 15 15 05 15 15 05 10 20 10 20 10 20 15 20 10 20 10 20 15 20 10 20 10 20 15 20 10 20 10 20 15 20 10 20 20 10 20 20 20 20 20 20 20 20 20 20 20 20 20
$\begin{array}{c} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 0 & 0 & 3 \\ 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \\ 2 & 1 & 2 \\ 0 & 2 & 3 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 0 & 1 & 6 \\ 2 & 2 & 3 \\ 1 & 2 & 3 \\ 2 & 2 & 0 \\ 1 & 1 & 6 \\ 2 & 3 & 5 \\ 2 & 1 & 8 \\ 2 & 4 & 0 \\ 1 & 1 & 5 \\ 2 & 2 & 8 \\ 2 & 4 & 0 \\ 1 & 1 & 5 \\ 2 & 2 & 8 \\ 2 & 4 & 0 \\ 1 & 1 & 5 \\ 2 & 2 & 8 \\ 4 & 1 & 5 \\ 2 & 2 & 8 \\ 4 & 1 & 6 \\ 5 & 1 & 2 \\ \end{array}$	D <sub>hkl</sub> <sup>(A)</sup> (observed) 3.052 2.992 2.946 2.840 2.479 2.422 2.124 1.779 1.747 1.721 1.635 1.596 1.504 1.395 1.330 1.295 1.330 1.295 1.285 1.666 1.108 1.094 1.075 1.063 1.023 0.982 0.957 0.949 0.936 0.921 0.905 0.892 0.846 0.818	d <sub>nkl</sub> <sup>(A)</sup> (calculat 3.067 2.955 2.845 2.487 2.426 1.793 1.746 1.725 1.636 1.598 1.502 1.396 1.326 1.296 1.339 1.326 1.296 1.339 1.326 1.296 1.286 1.106 1.094 1.071 1.064 1.071 1.022 0.981 0.957 0.950 0.936 0.921 0.994 0.891 0.891 0.891	ed) 40 35 40 35 25 100 50 80 05 35 35 30 50 20 30 10 30 30 10 10 25 15 15 05 05 10 20 10 20 10 20 10 20 15 20 20 15 20 20 20 20 20 20 20 20 20 20 20 20 20

LuTe <sub>3</sub>					
hkl	D <sub>hkl</sub> <sup>(A)</sup>	d <sub>hkl</sub> <sup>(A)</sup>	I <sub>obs</sub>		
	(observed)	(calculat			
080	3.124	3.142	80		
111	2.985	3.003	20		
131	2.831	2.845	100		
151	2.581	2.592	40		
171	2.307	2.313	25		
200	2.132	2.138	60		
002	2 000	2.139	1.5		
0 12 0	2.089	2.095	15		
0 11 1 0 14 0	1.819 1.791	1.823 1.796	25 15		
082	1.766	1.768	30		
280	1.700	1.768	50		
281	1.625	1.634	15		
1 13 1		1.629			
202	1.510	1.512	30		
0 12 2	1.493	1.497	10		
2 12 0		1.496			
0 14 2	1.375	1.375	10		
$2\ 14\ 0$		1.375			
282	1.361	1.363	25		
133	1.334	1.335	25		
331		1.335			
1 17 1	1.328	1.328	25		
153	1.304	1.306	20		
351	1 265	1.306	15		
1 15 2 1 7 3	1.265	1.261 1.266	15		
371		1.266			
1 11 3	1.163	1.164	15		
3 11 1	1.105	1.164	15		
2 14 2	1.156	1.157	10		
0 22 0	1.142	1.143	10		
263		1.141			
3 15 0	1.083	1.086	15		
0 20 2		1.084			
2 20 0		1.084			
004	1.069	1.069	15		
400		1.069			
084	1.013	1.012	10		
480	1 000	1.012	20		
313	1.008	1.007	20		
0 22 2		1.008			
2 22 0	0.000	1.008	20		
1 17 3 3 17 1	0.999	0.998 0.998	20		
1 25 1	0.954	0.998	50		
284	0.934	1.915	20		
482	0.915	0.915	20		
135	0.834	0.835	30		
531		0.835			
3 17 3		0.833			
1 29 1		0.833			
155	0.828	0.828	15		
551		0.827			
1 25 3	0.807	0.807	60		
3 25 1		0.807			

support of his graduate studies. Assistance rendered by N. L. Eatough, A. W. Webb, L. Merrill, K. Miller, M. D. Horton, and J. J. Hoen is gratefully acknowledged.

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The LTe<sub>2-x</sub> –type compounds reported in this paper were indexed on the basis of the lanthanide ditelluride unit cell without difficulty. The X-ray powder data in Table IV show that the unresolved doublets in the front reflection region of the lighter LTe<sub>2-x</sub> compounds are resolved for these heavier LTe<sub>2-x</sub> compounds. This is not unexpected, of course, since the  $c_0/a_0$  ratio of LTe<sub>2-x</sub> increases inversely with lanthanide ionic radius. For these reasons the LTe<sub>2-x</sub> compounds

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reported herein are believed to be analogous to the lanthanide ditellurides rather than to the  $L_4Te_7$ -type compounds. It is recognized, however, that the evidence is not conclusive and that a single-crystal structural analysis would be required in order completely to resolve the question. <sup>17</sup> A. A. Eliseev, V. G. Kuznetsov, E. I.

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