Table 1. *Lattice parameters and structural data for some* GdM *compounds, where* M *is* Al, Cu, Rh, Ag *or* Au

Compound	Lattice constant	Structure type	Reference
GdAl	$a = 3{\cdot}7208 \pm 0{\cdot}0002$ Å	CsCl + 2nd phase	(*a*)
GdAl	$a = 9{\cdot}274 \pm 0{\cdot}007$ $b = 7{\cdot}679 \pm 0{\cdot}008$ $c = 5{\cdot}584 \pm 0{\cdot}003$	CeAl	This paper
GdCu	$a = 3{\cdot}505$	CsCl	(*b*)
GdCu	$a = 3{\cdot}503 \pm 0{\cdot}001$	CsCl	(*a*)
GdCu	$a = 3{\cdot}5020 \pm 0{\cdot}0004$	CsCl	This paper
GdRh	$a = 3{\cdot}4425 \pm 0{\cdot}0006$	CsCl	This paper
GdAg	$a = 3{\cdot}66$	CsCl	(*c*)
GdAg	$a = 3{\cdot}653$	CsCl	(*d*)
GdAg	$a = 3{\cdot}6476 \pm 0{\cdot}0008$	CsCl	(*a*)
GdAg	$a = 3{\cdot}6491 \pm 0{\cdot}0002$	CsCl	This paper
GdAu	$a = 3{\cdot}593 \pm 0{\cdot}002$	CsCl + 2nd phase	(*e*)
GdAu	$a = 3{\cdot}6009 \pm 0{\cdot}0008$ $a = 4{\cdot}522 \pm 0{\cdot}005$ $b = 10{\cdot}826 \pm 0{\cdot}008$ $c = 4{\cdot}734 \pm 0{\cdot}004$	CsCl and CrB	This paper This paper

(*a*) Baenziger & Moriarty (1961). (*b*) Dwight (1959*a*). (*c*) Dwight (1959*b*). (*d*) Iandelli (1960). (*e*) Chao, Luo & Duwez (1963).

Examination of the published literature indicates that the rare earth-aluminum compounds, RAl, crystallize with either b.c.c., CsCl type or one of two different orthorhombic structures, *i.e.* CeAl type, which belongs to the space group $Cmc2_1$ (van Vucht, 1957) or CrB type found for YAl (Dagerhamn, 1963). All the lines in the GdAl powder pattern could be indexed on the basis of the CeAl type orthorhombic structure. Although Baenziger & Moriarty (1961) found some b.c.c. lines in their complex X-ray pattern for GdAl while none were found in this research, this does not necessarily indicate that one of the results is incorrect. The difference could be explained by the existence of a high-temperature b.c.c. phase retained upon quenching by Baenziger & Moriarty (1961) but not retained in this research because of either too slow a cooling rate during quenching or too low an annealing temperature, *i.e.* below the orthorhombic $\rightleftarrows$ b.c.c. transition temperature.

Chao, Luo & Duwez (1963) found that when GdAu was very rapidly quenched, only the b.c.c. lines were observed, but when this compound was slowly cooled both the complex and b.c.c. lines were obtained. No other literature data are available concerning the structures of the complex phase of any of the rare-earth-gold equi-atomic compounds. All the lines, other than those which were indexed as b.c.c., CsCl type, could be indexed as orthorhombic CrB, B_f type.

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