TABLE III. The Voigt–Reuss–Hill moduli of MgO, CaF_2, β-ZnS, ZnSe, and CdTe.[a]

Material and reference temperature (°K)	Reference to c_{ij}[b]	K_{VRH}	G_{VRH}	E_{VRH}	G_V-G_R	E_V-E_R
MgO (300)	36D1	15.490	13.033	30.532	0.571	1.045
MgO (298)	55B1	15.333	12.623	29.712	0.475	0.877
MgO (293)	61S1	16.800	13.154	31.291	0.632	1.194
MgO (300)	63C1	15.530	13.013	30.513	0.573	1.051
MgO (298)	65B1	16.260	13.104	30.985	0.596	1.112
MgO (297)	65C1	16.205	13.056	30.873	0.595	1.109
CaF_2 (300)	28V1	8.447	4.251	10.920	0.325	0.716
CaF_2 (298)	55B1	8.827	4.241	10.965	0.250	0.557
CaF_2 (0)	58S1	8.800	4.708	11.985	0.185	0.399
CaF_2 (300)	60H1	9.000	4.120	10.723	0.244	0.550
CaF_2 (293)	63H1	8.386	4.264	10.936	0.324	0.712
β-ZnS (298)	18V1	6.930	3.112	8.114	0.520	1.180
β-ZnS (298)	44B1	8.410	2.945	7.908	0.481	1.157
β-ZnS (298)	51P1	7.667	2.604	7.017	0.271	0.656
β-ZnS (302)	63E1	7.187	3.208	8.372	0.539	1.226
β-ZnS (298)	63B1	7.840	3.276	8.619	0.556	1.286
β-ZnS (293)	63Z1	7.747	3.255	8.558	0.578	1.333
ZnSe (298)	63B1	5.953	2.945	7.573	0.689	1.524
CdTe (298)	62M1	4.238	1.406	3.796	0.248	0.604
CdTe (77)	63B1	4.917	1.450	3.959	0.192	0.477

[a] All moduli are in units of 10^{11} dyn/cm^2.

[b] See Table II for the complete references.

respectively. Knowing the bulk modulus K^* and the shear modulus G^*, one can calculate Young's modulus E^*, the longitudinal modulus L^*, and Lamé's constant λ^* as well as the compressibility χ^* and Poisson's ratio μ^* from the well-known relations[10] of the isotropic elasticity.

The result of these calculations for the isotropic bulk, shear, and Young's moduli are tabulated in Table III for all the single-crystal data listed in Table II. Also entered are the differences in the limiting Voigt and Reuss moduli since they are related to the actual magnitude of the elastic anisotropy possessed by crystals.[11] Table IV compares selected values of the measured and calculated isotropic moduli from Table I and Table III, respectively.

5. DISCUSSION

It is apparent from Table IV that the measured polycrystalline elastic moduli are in good agreement with the isotropic VRH moduli calculated from the corresponding single-crystal elastic constants. The differences observed between the measured and calculated values are in most cases within the scatters in the calculated VRH moduli resulting from the differences in the single-crystal elastic constants of one author to another (see Table III). This indicates the success of

TABLE IV. Comparison between the measured and calculated isotropic elastic moduli of MgO, CaF_2, β-ZnS, ZnSe, and CdTe.

Material and references[b]		Elastic modulus[a] Shear	Young's	Bulk
MgO	Single-crystal (65C1)	13.056	30.873	16.205
	polycrystalline	12.93(±0.10)	30.72(±0.12)	16.41
CaF_2	Single-crystal (60H1)	4.120	10.723	9.000
	polycrystalline	4.07(±0.07)	10.75(±0.09)	9.98
β-ZnS	Single-crystal (63E1)	3.208	8.372	7.187
	polycrystalline	3.18(±0.07)	8.38(±0.09)	7.66
ZnSe	Single-crystal (63B1)	2.945	7.573	5.953
	polycrystalline	2.88(±0.07)	7.46(±0.10)	6.67
CdTe	Single-crystal (62M1)	1.406	3.796	4.238
	polycrystalline	1.38(±0.03)	3.73	4.25

[a] All moduli are in units of 10^{11} dyn/cm^2.

[b] See Table II for the complete references.

[10] F. Birch, J. Geophys. Res. 65, 3855 (1960); Table 4.
[11] D. H. Chung and W. R. Buessem, J. Appl. Phys. (in press).