158*S* peak had a greater proportion of tetrads in both instances (18.7 percent in control, 64.5 percent in operated). It appears likely that the increased concentration of tetrads is the result of linear class polysome loss during incubation.

Thus skin and feather polysome distribution and structure are apparently little affected by removal of the pituitary gland in embryos incubated for 12 days. In contrast, there are clear differences in polysome structure and distribution when these operated and control birds are incubated for 15 days. It should also be noted that the gross appearance of the feathers of the 15-day-old hypophysectomized birds is very similar to that of the 12-day-old control embryos. This parity in gross feather development of 12-day-old control embryos and 15-day-old hypophysectomized embryos is not unexpected, since polysome morphology and distribution of these groups are equally parallel.

How configuration of the square-shaped polysome is related to inability to synthesize protein still remains to be elucidated, but it appears that translation for keratin synthesis requires that the tetrad open (*3*), which in turn, from my study, seems to be dependent on the presence of an intact pituitary gland. The requirement of an intact pituitary gland is inferred from the fact that birds with severely damaged heads but intact pituitary glands develop feathers and polysome patterns just as the unoperated controls do.

My study does not indicate which hormone or hormones may be responsible for control of the structure of the tetrad-shaped polysomes or whether this control is exerted upon the cytoplasm or the nucleus. Nevertheless, it is interesting to note that polysome structure appears to be hormonally regulated.

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References and Notes

1. N. W. Fugo, *J. Exp. Zool.* **85**, 271 (1940); M. S. Mitskevich, "Glands of internal secretion in the embryonic development of birds and mammals," *Acad. Sci. U.S.S.R.* (Moscow, 1957). Translation published for NSF by the Israel program for scientific publications 1959.
2. T. Humphreys, S. Penman, E. Bell, *Biochem. Biophy. Res. Commun.* **17**, 618 (1964).
3. E. Bell, T. Humphreys, H. S. Slayter, C. E. Hall, *Science* **148** (1965).
4. N. W. Fugo and E. Witschi, *Latv. Biol. Biedr. Rak.* **8**, 73 (1938).
5. H. Ris, personal communication.
6. I thank Jeanette K. Toda and Betty Zeloski for technical assistance and Dr. H. D. Brown of Merck and Co. for gifts of actinomycin. I thank Dr. H. Ris, Dept. of Zoology, University of Wisconsin, for carrying out the electron microscopy. Supported by NIH grants CA 08318-01, CA 06295-04, and 1-801-FR 05138.

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Quenchable High-Pressure Polymorph of Zinc Selenate

Abstract. *A new quenchable high-pressure form of zinc selenate* (*ZnSeO*$_4$) *was produced by subjecting the low-pressure modification to 40 kilobars at 400°C for 30 minutes. The new form is orthorhombic, space group* D_{2h}^{17}–Cmcm. *The cell constants at 29°C are:* a, *5.511 angstroms;* b, *8.110 angstroms; and* c, *6.585 angstroms. The calculated density is 4.70 grams per cubic centimeter in comparison with 4.61 grams per cubic centimeter for the low-pressure modification. This implies a volume change of 2 percent at the transition.*

Pannetier and Courtine (*1*) have found that anhydrous zinc selenate is orthorhombic and has the space group D_{2h}^{16}–*Pbnm*, with *a* equal to 4.905 Å, *b* equal to 9.012 Å, and *c* equal to 6.793 Å (*2*). This is the same space group as that of the low-pressure modification of $ZnSO_4$ (*3*). However, at higher pressures the low-pressure form of $ZnSO_4$ changes to a high-pressure form which is also orthorhombic, but which has the space group D_{2h}^{17}–*Cmcm* (*4*). Similar polymorphic behavior is encountered in a number of divalent sulfates (*4*) and selenates (*5*), and it was thought desirable to investigate $ZnSeO_4$ and to find out whether this substance could also exist in two different structure types.

Zinc selenate was prepared by heating $ZnSeO_4 \cdot H_2O$ to 250°C for 2 hours. The resulting material was subjected to 40 kb at 400°C for ½ hour in a piston-anvil high-pressure apparatus (*6*); the encapsulating technique (*6*) was used. The sample was cooled while at 40 kb. The x-ray powder diffraction pattern of the product was obtained at 29°C in a Philips high-angle diffractometer, with filtered CoKα radiation ($\lambda = 1.7889$ Å) (Table 1).

Table 1. X-ray powder pattern of high-pressure $ZnSeO_4$ at 29°C (CoKα radiation).

d-spacing		*hkl*	Intensity (*I*)
Obs. (Å)	Calc. (Å)		
4.55	4.558	110	25
4.05	4.055	020	20
3.745	3.748	111	100
3.449	3.453	021	50
2.753	2.755	200	25
2.669	2.669	112	75
2.560	2.556	022	20
2.430	2.427	130	35
2.149	2.154	221	15
2.026	2.028	040	10
1.934	1.930, 1.938	023, 041	10
1.872	1.874	222	15
1.727	1.726, 1.729	042, 311	12

The diffraction pattern was different from that of ordinary $ZnSeO_4$ (*1*). However, it was entirely similar to that of the high-pressure modification of $ZnSO_4$ (*4*). All the observed peaks could be explained on the basis of the following orthorhombic unit-cell dimensions: $a = 5.511 \pm .010$ Å; $b = 8.110 \pm .010$ Å; $c = 6.585 \pm .010$ Å.

The selection rules are consistent with a space group D_{2h}^{17}–*Cmcm*, as in the case of high-pressure $ZnSO_4$.

The calculated density of high-pressure $ZnSeO_4$ at 29°C, if $z = 4$, is 4.70 g/cm^3. The low-pressure form has a density of 4.61 g/cm^3 (*1*). This implies a volume change at the transition of 2 percent. The corresponding volume change in the case of $ZnSO_4$ is 3.4 percent.

It may be noted that the general rule (*5*) for the transition $D_{2h}^{16} \rightarrow D_{2h}^{17}$, namely, increase of *a*, decrease of *b*, and decrease of *c*, applies to $ZnSeO_4$ also. This is consistent with the structural differences between the two phases (*3, 5, 7*).

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References and Notes

1. G. Pannetier and P. Courtine, *Compt. Rend.* **260**, 1419 (1965).
2. There is a misprint in the paper by Pannetier and Courtine (*1*). Their value of $c = 6.293$ Å should read $c = 6.793$ Å. Their calculated density is therefore also incorrect.
3. P. A. Kokkoros and P. J. Rentzeperis, *Acta Cryst.* **11**, 361 (1958).
4. C. W. F. T. Pistorius, *Z. Krist.* **116**, 220 (1961).
5. H. C. Snyman and C. W. F. T. Pistorius, *ibid.* **120**, 317 (1964).
6. D. T. Griggs and G. C. Kennedy, *Am. J. Sci.* **254**, 722 (1965).
7. P. I. Dimaras, *Acta Cryst.* **10**, 313 (1957).

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