Short Communications

Contributions intended for publication under this heading should be expressly so marked; they should not exceed about 1000 *words; they should be forwarded in the usual way to the appropriate Co-editor; they will be published as speedily as possible. Publication will be quicker if the contributions are without illustrations.*

Acta Cryst. (1966). **21**, 999

The influence of Bragg scattering on inelastic and other forms of diffuse scattering of electrons (Corrections).

By J. GJØNNES, *Department of Physics, University of Melbourne, Australia*

(*Received* 20 *August* 1966)

The following corrections are necessary in a recent article (Gjønnes, 1966) on the above subject:

On page 244, line 25 (left hand column) Δ_2^2 should be Δ^2, so that the equation at the end of the paragraph reads $4\Delta^2=\zeta_1\zeta_2+4V_h^2$.

On page 248, V_{hf} should be inserted before the sign of integration in the last equation of Appendix I, and this should read:

$$\psi_{hg}(z-z_0)=\delta_{hg}\exp\left[i\zeta_h(z-z_0)\right]+i\sum_f V_{hf}\int\exp\left[i\zeta_h(z-z')\right]\psi_{fg}(z'-z_0)dz' .$$

Reference

GJØNNES, J. (1966). *Acta Cryst.* **20**, 240.

Acta Cryst. (1966). **21**, 999 L1754-66.299

The uranium–iron–silicon system. The new phase U_2FeSi_3.

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During the investigation of the ternary system uranium–iron–silicon a new phase with the approximate composition U_2FeSi_3 has been found. The new phase appears to have a large range of homogeneity and lies on the quasi-binary section UFe_2–USi_2.

Structure determination exclusively based on the powder data showed this particular phase to belong to the hexagonal system (space group $P6/mmm$). Unit-cell dimensions for the composition $U(Fe_{0\cdot20}, Si_{0\cdot80})_2$ were found to be $a=4\cdot01$, $c=3\cdot84$ ($c/a<1$). Density measurements showed that the unit cell contains $\frac{1}{2}(U_2FeSi_3)$. From these data it was assumed that the atoms occupy the following positions: 1 U in (*a*), 2 (Fe, Si) in (*d*) (C_{32}-type structure).

The similarity of the structure to those of U_2FeSi_3 and USi_2 (Brown & Norreys, 1961) suggests that the U_2FeSi_3 structure may be derived from the USi_2 structure by replacement of approximately 18 % $[U(Fe_{0\cdot18}, Si_{0\cdot82})_2]$ to 28 % $[U(Fe_{0\cdot28}, Si_{0\cdot72})_2]$ of silicon atoms by iron. For an increasing number of silicon replacements the *c* value of the unit cell decreases, while *a* remains approximately constant. Iron would therefore have a stabilizing effect on the U_2FeSi_3 structure, which explains why this phase remains stable after annealing at 800 °C for one week and in the as-cast condition whereas the similar phase USi_2 decomposes above 450 °C (Brown & Norreys, 1961).

The possibility that this new phase is merely an extension of the hexagonal phase $USi_{1\cdot67}$ ($c/a>1$) in the ternary diagram U–USi_2–UFe_2 seems to be ruled out by the constitutional studies already undertaken in this region of the diagram.

In order to examine the influence of the electronic structures and radii of the transition metals upon the formation of these structures, the effect of replacement of iron by cobalt, manganese, nickel and copper is also being investigated. It has been found that cobalt, at least, forms an isomorphous ternary phase with U_2FeSi_3.

Reference

BROWN, A. & NORREYS, I. I. (1961). *Nature, Lond.* **191**, 61.