On the Silicides $EuIr_2Si_2$ and Lu_5Si_3

Ute Ch. Rodewald[a], Birgit Heying[a], Dirk Johrendt[b], and Rainer Pöttgen[a]

[a] Institut für Anorganische und Analytische Chemie, Westfälische Wilhelms-Universität Münster, Corrensstraße 36, D-48149 Münster, Germany
[b] Department Chemie und Biochemie, Ludwig-Maximilians-Universität München, Butenandtstraße 5 – 13 (Haus D), D-81377 München, Germany

Reprint requests to R. Pöttgen. E-mail: pottgen@uni-muenster.de

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$EuIr_2Si_2$ was synthesized from the elements in a sealed tantalum tube in a water-cooled sample chamber of an induction furnace. Lu_5Si_3 was obtained by arc-melting of the elements. Both silicides were investigated by X-ray powder and single crystal diffraction: $BaAl_4$ type, $I4/mmm$, $a = 407.4(1)$, $c = 1010.8(7)$ pm, $wR2 = 0.0492$, 134 F^2 values, 9 variables for $EuIr_2Si_2$ and Mn_5Si_3 type, $P6_3/mcm$, $a = 820.0(1)$, $c = 614.2(1)$ pm, $wR2 = 0.0511$, 311 F^2 values and 12 variables for Lu_5Si_3. The iridium and silicon atoms in $EuIr_2Si_2$ build up a three-dimensional $[Ir_2Si_2]$ network with Ir–Si and Si–Si interactions. The europium atoms fill cages within the network. The metal-rich silicide Lu_5Si_3 contains columns of face-sharing, empty Lu_6 octahedra and *isolated* silicon atoms in a distorted tri-capped trigonal prismatic coordination. Chemical bonding in these silicides is briefly discussed.

Key words: Silicide, Crystal Structure, Solid State Synthesis, Chemical Bonding