The magnesium-rich intermetallic compound Sm$_3$RuMg$_7$ was synthesized by induction melting of the elements. Single crystals were grown by slow cooling of the polycrystalline sample. The structure was characterized by powder and single-crystal X-ray diffraction: ordered Ti$_6$Sn$_5$ type, $P6_3/mmc$, $Z = 2$, $a = 1034.1(2)$ pm, $c = 611.3(1)$ pm, $wR^2 = 0.0216$, 399 $F^2$ values and 19 parameters. The ruthenium atoms have slightly distorted octahedral samarium coordination. These RuSm$_{6/2}$ octahedra (Ru–Sm 279 pm) are condensed via common faces leading to chains in the $c$ direction which are arranged in the form of a hexagonal rod packing. Between these rods the Mg$_2$ atoms build chains of face-sharing trigonal prisms. Alternately these prisms are centered by Mg$_3$ or capped by Mg$_1$ atoms on the rectangular faces. Within the magnesium substructure the Mg–Mg distances range from 303 to 335 pm. The Mg$_3$ site shows slight mixing with samarium, leading to the composition Sm$_{3.16}$RuMg$_{6.84}$ for the investigated crystal. The compounds RE$_3$RuMg$_7$ ($RE =$ Gd, Tb) are isotypic.

**Key words:** Magnesium, Rare Earth Compounds, Crystal Structure