The binary transition metal magnesium compounds RhMg$_3$ and Ir$_3$Mg$_{13}$ have been synthesized from the elements in sealed niobium tubes and investigated on the basis of X-ray powder and single crystal data: Cu$_3$P type, $P6_3cm$, $a = 790.5(4)$ pm, $c = 825.6(3)$ pm, $wR_2 = 0.0244$, 344 $F^2$ values, 27 variable parameters for RhMg$_3$, and $R3c$, $a = 1607.0(2)$ pm, $c = 844.88(9)$ pm, $wR_2 = 0.0535$, 656 $F^2$ values, 29 variable parameters for Ir$_3$Mg$_{13}$. The rhodium atoms in RhMg$_3$ have coordination number 11. These polyhedra show an AB AB stacking sequence like in the hexagonal close-packed structure. The crystal chemical relation of the Cu$_3$P type structure of RhMg$_3$ with the aristotype Na$_3$As (IrAl$_3$) is discussed on the basis of a group-subgroup scheme. Ir$_3$Mg$_{13}$ crystallizes with a new complex structure type with coordination numbers of 11, 14, 15, 14, and 12 for the Ir, Mg1, Mg2, Mg3, and Mg4 atoms, respectively.

Key words: Magnesium, Crystal Structure, Solid State Synthesis