Ternary Antimonides Yb*T*Sb (*T* = Ni, Pd, Pt, Cu, Ag, Au) – Synthesis, Structure, Homogeneity Ranges, and ^{121}Sb Mössbauer Spectroscopy

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The ternary antimonides Yb*T*Sb (*T* = Ni, Pd, Pt, Cu, Ag, Au) were synthesized by reaction of the elements in sealed tantalum tubes in a high-frequency furnace. The structures of YbCuSb (NdPtSb type), YbAgSb (TiNiSi type), and YbAuSb (NdPtSb type) were confirmed on the basis of X-ray powder diffraction data. Those of the nickel, palladium, and platinum based antimonides (cubic MgAgAs type) were refined from single crystal X-ray data. The nickel based antimonide has a pronounced homogeneity range $YbNi_xSb$. The structures of five crystals have been investigated. The cubic lattice parameter increases with increasing nickel content from 613.13(6) pm (x = 0.17) to 621.25(5) pm (x = 0.63). Full occupancy of the palladium and antimony sites was observed for YbPdSb while the platinum compound shows some platinum vacancies leading to the composition $YbPt_{0.969(7)}Sb$ for the investigated crystal. A new, high-temperature modification of YbPdSb was obtained by rapidly quenching an arc-melted sample: TiNiSi type, *Pnma*, a = 725.6(2), b = 458.3(1), c = 785.4(2) pm, $wR2$ = 0.1255, 421 F^2 values, 20 variables. The antimonides Yb*T*Sb (*T* = Ni, Pd, Pt, Cu, Ag, Au) show single ^{121}Sb Mössbauer signals at isomer shifts ranging from –7.34 to –7.82 mm/s. The crystal chemistry and chemical bonding of these antimonides is discussed.