Exploratory studies of the Cu–Pd–Se system at 650 °C, 550 °C, 400 °C, and 300 °C - DTU Orbit (19/02/2019)

**Exploratory studies of the Cu–Pd–Se system at 650 °C, 550 °C, 400 °C, and 300 °C**
The condensed-phase system Cu–Pd–Se was investigated by means of dry syntheses from elements in evacuated silica glass tubes at 650 °C, 550 °C, 400 °C, and 300 °C. Synthesized phases were analysed by electron microprobe and textural studies in polished sections. At 650 °C an extensive selenide liquid field covers central portions of the system, coexisting with a limited choice of Pd selenides, Cu$_{2-x}$Se, alloys, and a (Cu,Pd)Se$_2$ solid solution. The selenide melt recedes to the Pd side of the system at 550 °C and its remnants persist at 400 °C. At the lower temperature, the gamut of Pd selenides becomes richer, and especially Pd$_6$Se and Pd$_{17}$Se$_{15}$ display significant solubility of Cu. The composition range of (Cu,Pd)Se$_2$ broadens and moves towards Cu-richer compositions as temperature decreases; CuSe and CuSe$_2$ appear at 300 °C. The synthetic analogue of jagüeite, Cu$_{2-3x}$Pd$_3$Se$_{4-x}$, is present at 400 °C and 300 °C, at Se concentrations above the Cu$_{2-x}$Se–Pd$_{17}$Se$_{15}$ line. At all examined temperatures, the individualized CuPd alloy dissolves Se, up to ~5 at% at low temperatures.

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