

## Ba<sub>8</sub>{Cu,Zn,Pd}<sub>x</sub>Ge<sub>46-x</sub> CLATHRATES

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Formation, crystal chemistry and physical properties were investigated for the solid solutions Ba<sub>8</sub>Cu<sub>x</sub>Ge<sub>46-x-v</sub>□<sub>v</sub>, Ba<sub>8</sub>Pd<sub>x</sub>Zn<sub>y</sub>Ge<sub>46-x-y-v</sub>□<sub>v</sub>, and Ba<sub>8</sub>Cu<sub>x</sub>Zn<sub>y</sub>Ge<sub>46-x-y-v</sub>□<sub>v</sub> (□ is a vacancy). The phase boundary of the clathrate phases was determined from metallography, EMPA and X-ray powder and X-ray single crystal data. Structural investigations for all specimens confirm isotypism with the cubic primitive clathrate type I structure (lattice parameters  $a = \sim 1.1$  nm and space group type Pm-3n). Temperature dependent X-ray spectra and the heat capacity define a low lying, almost localized, phonon branch. Studies of transport properties evidence electrons as the majority charge carriers in the system. Thermal conductivity exhibits a pronounced low temperature maximum, dominated by the lattice contribution, while at higher temperatures the electronic part gains weight.

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