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Photo- and radiation-induced synthesis of (Ni,Zn)O or mixed NiO-ZnO oxides

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Set of mixed oxide samples containing crystalline NiO-ZnO with variable composition was prepared by simple irradiation of aqueous solutions containing nickel and/or zinc nitrate hexahydrate, with subsequent annealing. Effects of various types of radiation were studied - solutions were irradiated either by accelerated electrons or UV light. Due to irradiation, weakly crystalline solid precursor was formed. After annealing at 200-300 ℃, nanocrystalline (Ni,Zn)O or a mixture of NiO-ZnO oxides were formed, with different amounts of nickel or zinc, depending on the composition of initial solution. Due to high level of interaction between nickel and zinc compounds achieved, formation of solid solution was frequently observed even in the NiO-ZnO mixture. The size of the crystallites was calculated from XRPD spectra to be in order of tens of nm. Photo- or radiation-induced synthesis yields material with quality nanocrystals and very high specific surface area.

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