

MORFOLOŠKE I MAGNETNE OSOBINE NANOPRAHOVA CuO DOPIRANIH Ag

MORPHOLOGICAL AND MAGNETIC PROPERTIES OF CuO NANOPOWDERS DOPED WITH Ag

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CuO je dopiran sa Ag da bi se dodatno poboljšala njegova multiferoična svojstva jer je pokazano da poremećaj u vidu nečistoća može stabilizovati feroelektričnu fazu. Samopropagirajuća sinteza na sobnoj temperaturi primenjena je za sintezu nanočestica čvrstih rastvora oksida bakra i srebra sastava $Cu_{1-x}Ag_xO$ ($x=0,01-0,05$). Uspesna reakcija se odvija između metalnog nitrata i natrijum hidroksida. Sintetizovani prahovi su dalje kalcinirani dva puta na $700\text{ }^\circ\text{C}$. Difrakcioni obrazac je snimljen na sobnoj temperaturi i atmosferskom pritisku bez ikakvog ponovnog zagrevanja uzorka. Urađena je Ritveldova metoda za proces rafinacije fitinga, koja je pokazala ugradnju Ag^{3+} jona u kristalnu rešetku CuO, gde oni zamenjuju Cu^{2+} jone. SQUID magnetometar je korišćen za ispitivanje magnetnog ponašanja sintetizovanih materijala u temperaturnom opsegu 2-400 K. Uočene su male promene u magnetnim svojstvima $Cu_{1-x}Ag_xO$ u poređenju sa CuO. Veličina i morfologija čestica su određene transmisijom elektronskom mikroskopijom (TEM) i skenirajućom elektronskom mikroskopijom (SEM).

Ključne reči: nanoprahovi; XRD; SQUID; SEM; TEM

CuO is doped with Ag to further improve its multiferroic properties since it has been shown that disorder in the form of impurities can stabilize the ferroelectric phase. Self-propagating synthesis at room temperature was applied for the synthesis of nanoparticles of solid solutions of copper and silver oxides with the composition $Cu_{1-x}Ag_xO$ ($x=0.01-0.05$). A successful reaction took place between metal nitrate and sodium hydroxide. The synthesized powders were further calcined twice at $700\text{ }^\circ\text{C}$. The diffraction pattern was recorded at room temperature and atmospheric pressure without any reheating of the sample. The Rietveld method for the fitting refining process was performed, which showed the incorporation of Ag^{3+} ions into the CuO crystal lattice, where they replace Cu^{2+} ions. The SQUID magnetometer was used to examine the magnetic behavior of the synthesized materials in the temperature range 2-400 K. Small changes in the magnetic properties of $Cu_{1-x}Ag_xO$ compared to CuO were observed. The size and morphology of the particles were determined by transmission electron microscopy (TEM) and scanning electron microscopy (SEM).

Key words: nanopowders; XRD; SQUID; SEM; TEM

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