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Abstract Book

SELF-ORGANIZED TiO_2-WO_3 EUTECTIC COMPOSITE AS A PHOTOANODE FOR PHOTOELECTROCHEMICAL WATER SPLITTING.

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Eutectic materials are two or multiphase materials formed during cooling of a mixable melt with an eutectic composition. The possibility of considering versatile combinations of various component materials in eutectics provides a broad palette for many applications. Eutectics obtained by the self-organization mechanism also seem to be very attractive as energy-generating materials. They have potential as photoactive materials, due to their multiphase character – various available photoactive component phases and multiple band gap energies and high crystallinity.

TiO_2-WO_3 eutectic is a new composite material, obtained by the micro-pulling-down method. Such mixed materials made of two semiconducting phases with bandgaps enabling absorption of UV-Vis wavelengths (TiO_2 – UV light, WO_3– VIS light) may be promising for photoelectrochemical applications – especially as materials for PEC photoanodes.

The growth and characterization of the eutectic microstructure from a TiO_2-WO_3 system, will be presented. together with the preliminary results of the photoelectrochemical measurements performed on fabricated TiO_2-WO_3 photoanodes.

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POSTER SESSION on OCTOBER 17, 2016 (Monday)

SYNTHESIS OF NEW ORTHOBORATES $KBaR(BO_3)_2$ (R - Pr, Nd)

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Orthoborates $KBaR(BO_3)_2$, R – rare-earth elements are of interest as new luminescent materials (undoped and doped). Orthoborates of this type were synthesized and studied almost for all rare earth elements except for La, Pr and Nd [1, 2, 3, 4]. All obtained compounds have trigonal symmetry with space group R-3m. Orthoborates $KBaPr(BO_3)_2$ and $KBaNd(BO_3)_2$ were synthesized without any impurity phases in narrow temperature ranges: 850-900 °C, and 850-950 °C respectively. Both orthoborates are isostructural and crystallize in the space group R-3m with lattice parameters a = 5.5052(12) %u0139, c = 18.402(8) %u0139 and a = 5.4956(5) %u0139, c =18.278(3) %u0139. IR spectra also confirm that $KBaPr(BO_3)_2$ and $KBaNd(BO_3)_2$ are isostructural and that they belong to the family of orthoborates $KBaR(BO_3)_2$. According to the DTA results $KBaPr(BO_3)_2$ and $KBaNd(BO_3)_2$ melt incongruently: T_m = 910 ºC and T_m = 1026 ºC, respectively.

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