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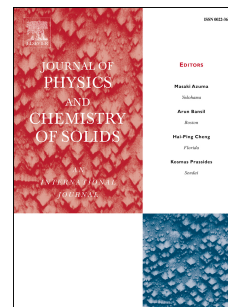
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Abstract

The leading concept of the research was to control functionality of vanadium dioxide by regulation of its crystal structure by means of nucleus in hydrothermal process. In order to prove the idea that VO₂ with a definite structure would have specific physicochemical properties the nuclei close to two most common VO₂ crystal phases were chosen: CuO for monoclinic and SnO₂ for tetragonal one. Powder morphology full characterization was indicated that the product inherits the crystal structure of the nucleus in hydrothermal process. Perspective optical and electrochemical vanadium dioxide performance was presented. In order to open prospects for wide application of the VO₂ powder a composite material based on vanadium dioxide as a functional component and methyl methacrylate as a matrix was obtained. The interaction between components was improved by VO₂ surface modification. Both inorganic and organic shells were used. Modified powders were successfully applied as smart coating for window in a room model.

Keywords

Vanadium dioxide; tin dioxide; copper(II) oxide; hydrothermal synthesis; smart coating

Abbreviations

NPs – nanoparticles

SMPT – semiconductor-to-metal phase transition

DMSO – dimethyl sulfoxide

EGMA – ethylene glycol dimethacrylate

MMA – methyl methacrylate

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