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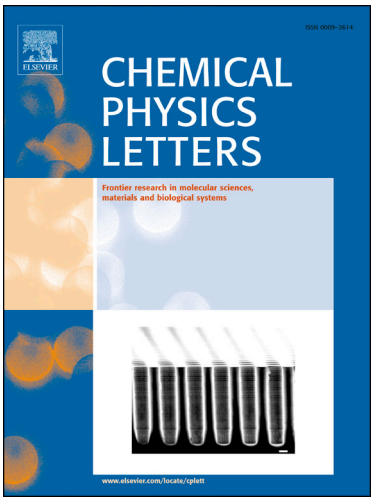

Research paper

Application of $CaCu_3Ti_4O_{12}$ based quadruple perovskites as a promising candidate for optoelectronic devices

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Application of $CaCu_3Ti_4O_{12}$ based quadruple perovskites as a promising candidate for optoelectronic devices

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Abstract

We report the synthesis of nanosized (40-50 nm) $CaCu_{3-x}Mn_xTi_{4-x}Mn_xO_{12}$ (x = 0, 0.5 and 1) quadruple perovskite (QP) semiconductor via a modified combustion method for use as Schottky barrier diode (SBD) at the Al/QP junction. The fabricated SBD is analysed on the basis of thermionic emission theory to observe its quality and some important diode parameters. For insight analysis of charge transport mechanism through metal-semiconductor junction, theory of space charge limited currents is applied and discussed in the light of parameters like carrier concentration, mobility-lifetime product and diffusion length. The Mn-doped exhibit better device performance compared to parent material.

Keywords: quadruple perovskite, Schottky barrier diode, thermionic emission, metal-semiconductor junction, space charge limited current

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