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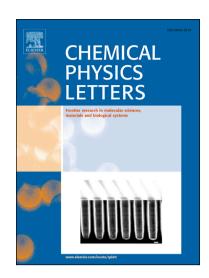
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ACCEPTED MANUSCRIPT

Application of CaCu₃Ti₄O₁₂ 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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