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Strain-induced piezoelectric field effects on the optical properties of ZnO nanowires¹ WENHAO GUO, SHUIGANG XU, NING WANG, M.M.T. LOY, SHENGWANG DU, Hong Kong University of Science and Technology — In our work, we report the evidence of piezoelectric effects which modifies the spatial distribution of the photo-generated carriers in bent ZnO nanowires. This piezoelectric effect, together with strain-induced changes of the energy band structure, results in redshift of free excitation photo-luminescence emission in strained ZnO nanowires. The net redshift is only dependent on the strain, independent on the diameter of the nanowire unless the depth of depletion layer is comparable to the size of nanowire. The experimental results obtained by the near-field scanning microscopy agree well with our numerical simulation.

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Wenhao Guo
Hong Kong University of Science and Technology

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