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Low-temperature high-pressure spectroscopy in Co^{2+} -doped ZnO: effects of crystal structure and dimensionality CARLOS RENERO-LECUNA, RAFAEL VALIENTE, MALTA-CONSOLIDER Team - Dpt. Applied Physics, Univ. of Cantabria, Spain, JESUS GONZALEZ, FERNANDO RODRIGUEZ, MALTA-CONSOLIDER Team - DCITIMAC, Univ. of Cantabria, Spain, ROSA MARTIN-RODRIGUEZ, Cond. Matt. & Interfaces, Debye Institute for NanoMaterials Science, Utrecht Univ. The Netherlands, GLORIA ALMONACID-CABALLER, ALFREDO SEGURA, MALTA-CONSOLIDER Team - ICMUV, Univ. of Valencia, Spain, VICENTE MARIN-BORRAS, VICENTE MUNOZ-SANJOSE, ICMUV, Univ. of Valencia, Spain — Wide band-gap semiconductors doped with transition-metal ions have attracted a lot of attention in the past few years. Here we focus on the spectroscopic properties of Co^{2+}-doped ZnO in different structural conformations such as single crystal, thin film, nanorods and nanoparticles under different $P-T$ conditions. Optical measurements were obtained by means of Raman and time-resolved spectroscopy using high-pressure techniques. Our main goal is to investigate the pressure-induced Wurtzite-to-Rock-Salt phase transition and how the structural conformation affects the Raman spectra as well as the absorption and emission spectra associated with Co^{2+} -doped ZnO. The effects of quantum confinement (dimensionality) are also investigated through the distinct spectral features observed in the samples as SC, TF, NW and NP helping us to clarify the still-unassigned absorption and emission spectra in terms of electron-phonon couplings and exchange interactions.

Carlos Renero-Lecuna
MALTA-CONSOLIDER Team - Dpt. Applied Physics, Univ. of Cantabria, Spain

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