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(57) Abstract :
The present invention relates to the synthesis and characterization of rare earth ions doped Zinc Oxide (ZnO) nanomaterials with potential applications in advanced technologies. The method involves dissolving ZnCl2 and NaOH in an alcoholic medium, followed by the gradual addition of glycerol and a 0.1 mol % solution of rare earth ions (Nd3+). Stirring the solution for two hours yields ZnO nanoparticles, and size-selective precipitation controls their size (10-100 nm). X-ray diffraction analysis confirms enhanced crystallinity. Radiative properties, including spontaneous emission probability (A), branching ratio (ß), radiative lifetime (t), and stimulated emission cross-section (sp), are evaluated for laser transitions, particularly in the near-infrared region.

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