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Nanostructure of ZnO Co-Doped with Er and Co: Morphological, Optical, Structural Properties And Photocatalytic Response

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The large amount of dyes that have been produced and discarded incorrectly has generated a great impact on the environment and human health. Its removal difficulty is due to its non-biodegradable nature and complex molecular structure, making it difficult to degrade. With the growing increase in water pollution with dyes caused mainly by disposal in the textile industries, scientists have studied methods of environmental remediation, through sustainable and cheap treatments, capable of solving this problem [1], [2]. The production of nanomaterials has been intensified for water treatment, using photocatalysis as it is a very effective method for removing dyes. Among the methods used, the ZnO photocatalyst has been widely used because of its high photocatalytic activity, chemical stability, and a controllable morphological preparation, even more so if it is co-doped with more materials, obtaining a photocatalytic amplification of ZnO. The ZnO nanoparticle photocatalyst co-doped in rare earths and transition metals has attracted a lot of attention, mainly because it uses light illumination effectively, improving its photocatalytic efficiency [3]. Thus, the objective of this work was to synthesize by the sol-gel method ZnO nanoparticles co-doped with Er and Co ions to verify their photocatalytic activity in the degradation of the yellow eosin dye. The characterization results indicated that the best material that obtained the highest photocatalytic activity with the highest percentage of dye degradation was ZnO that received the doping of 2% Er and 3% Co, which proved to be the best doping configuration of the samples synthesized. References [1] Bonilla-Petriciolet, Mendoza-Castillo Adrián, D. Ileana, Reynel-Ávila, H. Elizabeth Adsorption Processes for Water Treatment and Purification.Springer International Publishing (2017). [2] M. Sillanpää, M.C. Ncibi, A. Matilainen, M. Vepsäläinen. Removal of natural organic matter in drinking water treatment by coagulation: a comprehensive review. Chemosphere (2018), pp. 54-71. [3]AB Lavand, YS Malghe Synthesis characterization and photocatalytic activity of visible light from nitrogen doped zinc oxide nanospheres, J. Asian Ceram. Soc., 3 (2015), pp. 305 – 310.