

Fingerprint Detection Using Intercalated CdSe Nanoparticles on Non-Porous Surfaces

M. Algarra¹, K. Radotić², A. Kalauzi², D. Mutavdžić², A. Savić², J. Jiménez-Jiménez¹, E. Rodríguez-Castellón¹, J.C.G. Esteves da Silva³, J. José Guerrero-González⁴

¹Departamento de Química Inorgánica, Facultad de Ciencias, Universidad de Málaga, Spain

²Institute for Multidisciplinary Research, University of Belgrade, Serbia

³Centro de Investigação em Química (CIQ-UP). Faculdade de Ciências da Universidade do Porto, Portugal

⁴Policía Científica, Cuerpo Nacional de Policía, Málaga, Spain

A fluorescent nanocomposite based on the inclusion of CdSe quantum dots in porous phosphate heterostructures, functionalized with amino groups (PPH-NH₂@CdSe), was synthesized, characterized and used for fingerprint detection. The main scopes of this work were first to develop a friendly chemical powder for detecting latent fingerprints, especially in non-porous surfaces; their further intercalation in PPH structure enables not to spread the fluorescent nanoparticles, for that reason very good fluorescent images can be obtained. The fingerprints, obtained on different non-porous surfaces such as iron tweezers, mobile telephone screen and magnetic band of a credit card, treated with this powder emit a pale orange luminescence under ultraviolet excitation. A further image processing consists of contrast enhancement that allows obtaining positive matches according to the information supplied from a police database, and showed to be more effective than that obtained with the non-processed images. Experimental results illustrate the effectiveness of proposed methods.

