Optical Performances of Chromophores Embedded in Metal Organic Frameworks for Photonics in Harsh Environments

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Abstract

Fluorescent organic dyes are extremely useful and versatile for a wide range of applications. However, their long-term use, especially in harsh environments, is limited by stability issues. These problems can be addressed by encapsulating dyes within hosting platforms, such as Metal-Organic Frameworks (MOFs), which are well known for their sorption capacity and stability, even in extreme environments. In the present work, we investigate the optical properties of Rhodamine B and green emitting Carbon nanodots, when combined with Zr-based MOF-808. Finally, we showed that these nanocomposites maintain their optical properties even after exposure to UV, X-rays, and proton beam, positioning them as promising candidates for photonics applications in harsh environments.

Keywords: Fluorescent organic dyes, Metal Organic Frameworks, Shielding effects, Photonics applications

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