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Luminescent Materials in Glass: The Best of Both Worlds

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Optical glassy composites have been highlighted for combining the luminescent properties of crystalline materials with the chemical stability and ease of processing offered by glass hosts. This synergy enables the use of sensitive materials in more severe conditions. [1] For example, persistent luminescent (PersL) materials are widely incorporated into polymer-based composites for glow-in-the-dark emergency signs. However, despite the convenience of preparing polymer hosts under mild processing conditions, these composites often degrade when exposed to prolonged sunlight and harsh weather. In contrast, glass hosts offer greater stability, enhancing the composite's durability and expanding its potential applications. Nevertheless, the preparation of glassy composites can be challenging, mainly due to the high temperature required in the melt-quenching process.[2] Thus, understanding the process behind composite fabrication is essential for designing new materials. In this work, we investigate Sr2MgSi2O7:Eu2+,Dy3+ (SMSO) PersL materials incorporated into NaPO3–Ga2O3 glass hosts. The composites were evaluated in terms of their photoluminescence properties and persistent luminescence decay times. Additionally, synchrotron radiation 2D hyperspectral mapping was employed to understand local luminescence, composition, and even the oxidation states of the ionic species of SMSO. The results provide insights into how the melting temperature influences the material-glass interface. These findings pave the way for the design of more robust optical composites with tailored properties for advanced applications.

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References
L.G. Merízio, T.A. Lodi, E. Bonturim, A.S.S. de Camargo, Opt. Mater., 134, 113046, (2022)

J. Massera, P. Głuchowski, M. Lastusaari, L.C.V. Rodrigues, L. Petit, J. Hölsä, L. Hupa, M., J. Eur. Ceram. Soc. 35 1255–1261, (2015)