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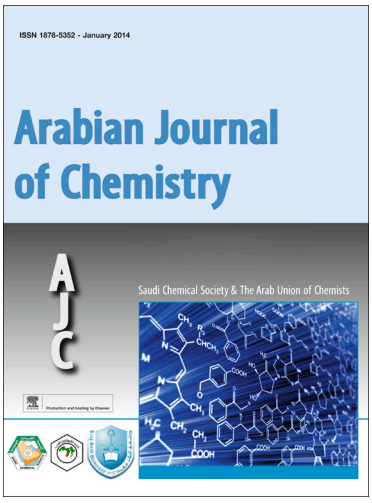

Original article

Facile LaOF: Sm^{3+} based labeling agent and their applications in residue chemistry of latent fingerprint and cheiloscopy under UV-visible light

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ACCEPTED MANUSCRIPT

Facile LaOF: Sm^{3+} based labeling agent and their applications in residue chemistry of latent fingerprint and cheiloscopy under UV-visible light

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Abstract

Luminescent lanthanum oxyfluoride nano inorganic materials were considered to be prospective building blocks for multifunctional applications. This offers new potentials in surface-based science comprising of visualization of latent fingerprint (LFPs) and lips print on non-porous surfaces. Traditional visualization techniques possess high backward hindrance, low sensitivity, complicated setup and poor visibility. To overcome with these problems, LaOF: Sm^{3+} (5 mol %) nanopowder (NPsS) prepared via sonochemical route were explored. Photoluminescence (PL) emission spectra exhibit strong emission peaks at ~ 566 nm, 607 nm, 653 nm and 708 nm attributed to $^4G_{5/2} \rightarrow {}^6H_{5/2}$, $^4G_{5/2} \rightarrow {}^4H_{7/2}$, $^4G_{5/2} \rightarrow {}^6H_{9/2}$ and $^4G_{5/2} \rightarrow {}^6H_{11/2}$ intra-4f orbital transitions of Sm^{3+} ions respectively. Estimated photometric properties confirm that the material emits warm orange red color. Therefore, the synthesized phosphor materials may quite useful for LFPs recovery, cheiloscopy and optoelectronics applications.

Keywords: Ultrasonication; Photoluminescence; Forensic; Cheiloscopy; Solid state lighting.

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