

Accepted Manuscript

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PII: S1386-1425(18)30183-5
DOI: doi:[10.1016/j.saa.2018.02.066](https://doi.org/10.1016/j.saa.2018.02.066)
Reference: SAA 15870

To appear in: *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*

Received date: 23 June 2017
Revised date: 25 January 2018
Accepted date: 24 February 2018

Please cite this article as: Xingjia Guo, Jie Yao, Xuehui Liu, Hongyan Wang, Lizhi Zhang, Liping Xu, Aijun Hao, LaPO₄:Eu fluorescent nanorods, synthesis, characterization and spectroscopic studies on interaction with human serum albumin. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Saa(2017), doi:[10.1016/j.saa.2018.02.066](https://doi.org/10.1016/j.saa.2018.02.066)

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LaPO₄:Eu fluorescent nanorods, synthesis, characterization and spectroscopic studies on interaction with human serum albumin

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Abstract

Eu³⁺ doped LaPO₄ fluorescent nanorods (LaPO₄:Eu) was successfully fabricated by a hydrothermal process. The obtained LaPO₄:Eu nanorods under the optimal conditions were characterized by means of transmission electron microscopy (TEM), X-ray diffraction (XRD) technique, Fourier transform infrared (FTIR), UV-vis absorption and fluorescence spectroscopy. The nanorods with a length of 50 – 100 nm and a diameter of about 10 nm, can emit strong red fluorescence upon excitation at 241nm. The FTIR result confirmed that there are lots of phosphate groups on the surfaces of nanorods. In order to better understand the physiological behavior of nanorods in human body, multiple spectroscopic methods were used to study the interaction between the LaPO₄:Eu nanorods and human serum albumin (HSA) in the simulated physiological conditions. The results indicated that the nanorods can effectively quench the intrinsic fluorescence of HSA through a dynamic quenching mode with the association constants of the order of 10³ L/mol. The values of the thermodynamic parameters suggested that the binding of the nanorods to HSA was a spontaneous process and van der Waals forces and hydrogen bonds played a

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