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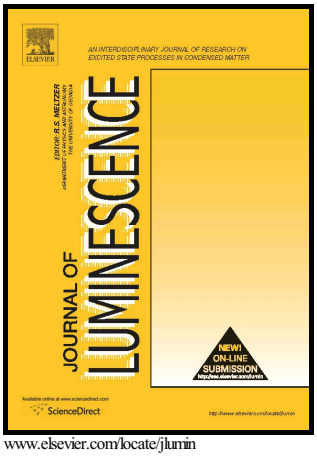

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PII: S0022-2313(18)30806-8
DOI: https://doi.org/10.1016/j.jlumin.2018.08.058
Reference: LUMIN15856

To appear in: *Journal of Luminescence*

Received date: 5 May 2018
Revised date: 2 July 2018
Accepted date: 19 August 2018

Cite this article as: Xia Sun, Junpeng Shi, Shenghui Zheng, Jinlei Li, Shougang Wang and Hongwu Zhang, Visualization of inflammation in a mouse model based on near-infrared persistent luminescence nanoparticles, *Journal of Luminescence,* https://doi.org/10.1016/j.jlumin.2018.08.058

HighlightsVisualization of inflammation in a mouse model based on near-infrared persistent luminescence nanoparticles

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Abstract

Inflammation is implicated in many human diseases, thus the diagnosis of inflammation is very important for the early treatment of diseases associated with inflammation. However, the high-sensitivity diagnosis of inflammation remains difficult. Near-infrared (NIR) persistent luminescence nanoparticles (PLNPs) were considered one of the most promising candidates for high-sensitivity bioimaging due to being free of autofluorescence. In this study, we synthesized PLNPs $Zn_{1.1}Ga_{1.8}Ge_{0.1}O_4:Cr^{3+}$ (ZGG) which demonstrated low cytotoxicity, excellent NIR persistent luminescence. We conducted the visualization of inflammation using these nanoparticles. The results indicated that the surface states of the ZGG influenced the progression of macrophage phagocytosis *in vitro*. ZGG-NH_2 demonstrated higher levels of internalization compared with ZGG-OH and ZGG-PEG. However, in contrast to the *in vitro* results, ZGG-PEG exhibited a greater ability to facilitate the visualization of inflammation *in vivo*. The long chains of PEG on the ZGG-PEG surfaces resulted in a lower reticuloendothelial system capture rate compared with both ZGG-OH and ZGG-NH_2. A higher concentration of the ZGG-PEG would cycle through the inflammation site, thereby inducing a high level of ZGG-PEG retention and thus yielding the strongest luminescent signal. Taken together, the results of this study demonstrate a simple and novel method for high-sensitivity visualization of inflammation *in vivo*.