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Authors: Chao Yang, Jing Xu, Dandan Yang, Xiaoxiao Wang, Bin Liu, Nongyue He, Zhifei Wang

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Communication

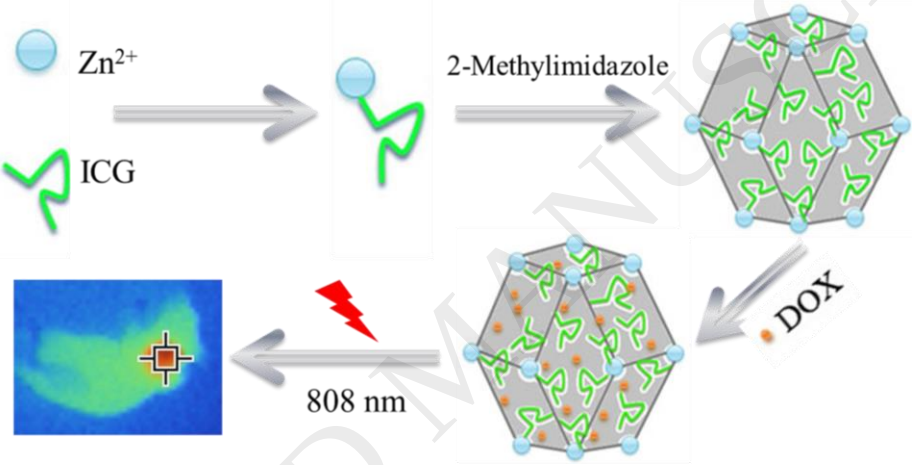
ICG@ZIF-8: One-step encapsulation of Indocyanine Green in ZIF-8 and use as a therapeutic nanoplatform

Chao Yang[a], Jing Xu[a], Dandan Yang[a], Xiaoxiao Wang[a], Bin Liu[c], Nongyue He[b,*], Zhifei Wang[a,*]

[a]*School of Chemistry and Chemical Engineering, Southeast University, Nanjing 211189, China*
[b]*School of Biological Science and Medical Engineering, Southeast University, Nanjing 210096, China*
[c]*Department of Biomedical Engineering, Nanjing Medical University, Nanjing 211166, China*

∗ Corresponding author.
E-mail address*: zfwang@seu.edu.cn; nyhe@seu.edu.cn*

Graphical abstract



This work reports a one-step encapsulation of Indocyanine Green (ICG) in ZIF-8 nanoparticles (NPs), which possess an absorption band in the near infrared region and have the good photothermal conversion efficiency. The *in vivo* and *in vitro* studies show that, after loading DOX, ICG@ZIF-8-DOX NPs exhibit the chem-and photothermal synergistic therapy for tumor.

ABSTRACT

How to fabricate zeolitic imidazole framework-8 (ZIF-8) based therapeutic nanoplatform will be of significance in biomedicine considering its good biocompatibility. Herein, we report a one-step encapsulation of Indocyanine Green (ICG) in ZIF-8 nanoparticles (NPs). The as-prepared ICG@ZIF-8 NPs possess an absorption band in the near infrared region and have the good photothermal conversion efficiency. The in vivo *and* in vitro *studies show that, after loading chemotherapy agent hydrophobic doxorubicin (DOX), ICG@ZIF-8-DOX NPs exhibit the chem-and photothermal synergistic therapy for tumor. In addition, it is found that the embedded ICG molecules in ICG@ZIF-8 NPs can be disassociated and released into the solution upon the 808 nm laser irradiation, demonstrating that as-prepared ICG@ZIF-8 NPs can also be used as the optical imaging probe to trace the degradability behavior of resulting NPs in future*

Keywords:ZIF, Therapeutics nanoplatform Chemo-photothermal treatment Indocyanine Green One-step

The rapid development of nanomaterials provides an opportunity for overcoming the challenges confronted in biomedical fields including cancer therapy [1-3], drug delivery [4], and imaging [5] due to their unique property in structure and the capability of enhanced permeability and retention effect (EPR) [6-9]. As an emerging porous nanomaterial, metal-organic frameworks (MOFs) composed of metal ions/clusters and organic bridging ligands have drawn growing attention from chemists and biologists in past decades in virtue of their tunable porosity, large specific surface area, and biodegradability, which can not only be used as drug delivery system (DDS), but also offer an chance to fabricate multifunctional nanomaterials via doping various metal ions and/or