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# Silica nanospheres entrapped with ultra-small luminescent crystals for protein delivery

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## Abstract

Constructing smart nano-systems for intracellular delivery of functional proteins has been endeavored for diverse biomedical applications, but suffered daunting challenges. Herein silica nanospheres entrapped with photoluminescent CaF<sub>2</sub>:Tm,Yb nanocrystals were synthesized and decorated with amino molecules for protein delivery. Amino-modified nanospheres presented high protein loading capacity and sustained release phenomenon. The photoluminescence of particles highly corresponded to protein release progress. The preliminary *in-vitro* study confirmed markedly enhanced cell up-taking efficiency of protein molecules with the nanocomposite developed.

**Keywords:** Intracellular protein delivery; photoluminescence; silica nanospheres.

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