Supplementary material

Fluoride Ion Sensing in Aqueous Medium by Employing Nitrobenzoxadiazole-Postgrafted Mesoporous Silica Nano Particles (MCM-41)

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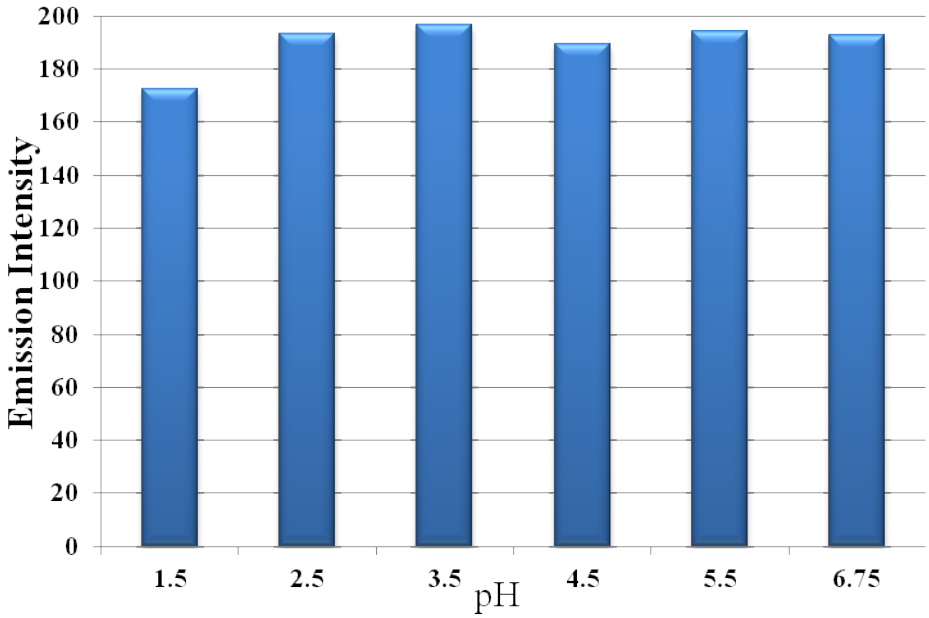

Fig 1. Photoluminescence intensity of NBD-AP-MCM particles (1mg/ml), in acetonitrile: water (7:3) solvent, as a function of pH of the solution (λexc. = 460 nm, λemi. = 541 nm).

Cellular Uptake Studies:

In recent years, there has been a huge interest in the application of surface modified mesoporous silica nanoparticles for biological studies, including drug delivery, cellular imaging and cell type recognition.[1] Mesoporous silica materials have been extensively studied for drug delivery to cancerous cells and has shown a great potential to be used as controlled and targeted drug carriers.[2,3] Stimuli responsive drug delivery has also been reported.[4] Apart from this, these nanoparticles have been utilized for important non-releasing applications like biomarkers and magnetic resonance imaging (MRI) contrast agents, due to the immunity from enzymatic digestion provided by the mesoporous structure.[5] These applications rely on the ability of these particles to be efficiently endocytosed in the cell. Therefore, cellular uptake studies of NBD-AP-MCM, were performed to

ensure, non-toxicity and ease of internalization of these particles into cellular environment, for future applications.

To illustrate the biocompatibility of NBD-AP-MCM, Tetrahymena thermophila cells were grown with or without 100 µg/ml NBD-AP-MCM. NBD-AP-MCM was added when cell density reached around 1 × 105 /ml. The cell numbers were

counted every 2 hours and the number of cells were plotted against time (Figure 11) . The growth of Tetrahymena was found to be similar in presence or absence of NBD-AP-MCM, and hence it can be concluded that NBD-AP-MCM is not toxic to cells.

Fluorescence microscopy images of NBD-AP-MCM uptake by starved Tetrahymena cell after 4 hours incubation are shown in figure 12. The cells display bright green fluorescence emitted by aggregates of NBD-AP-MCM non-uniformly accumulated inside the cells. These images suggest that the surface modifications present on the nanoparticles are compatible for cellular uptake. Hence, these particles are suitable to be used as cellular labelling agents and a possible fluorescent drug delivery system, in future.

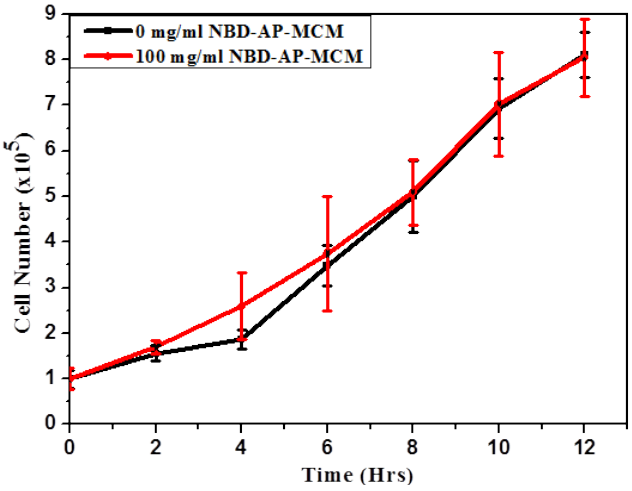

Fig 2. Cell growth curve of Tetrahymena cells in presence and in absence of 100 mg/ml NBD-AP-MCM.

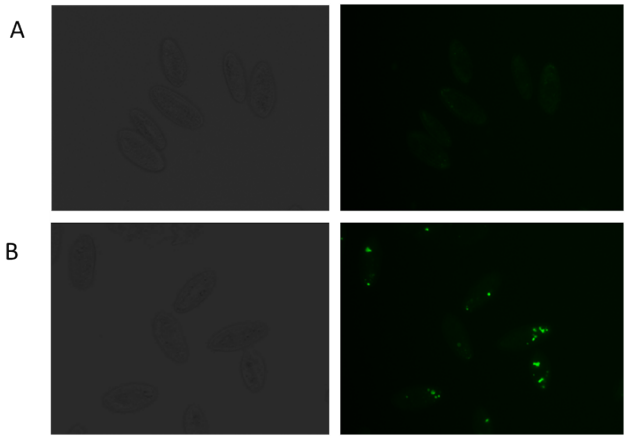

Fig 3. Fluorescence microscopic images of Tetrahymena cells incubated without NBD-AP-MCM (A) and with 100 µg/ml NBD-AP-MCM (B). Left panel: differential interference contrast microscopy (DIC) images, Right panel: Fluorescence images.

References

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