or metal oxide NP by surface-stabilizing agents or surface-modifying agents prior to SiO_2 coating. That is, the SiO_2 is coated on the surface indirectly. This leads to multiple steps being involved in the preparation, resulting in a complicated synthetic procedure.

Another approach for synthesizing SiO_2-coated metal NPs and metal oxide NPs may be to use reverse microemulsion, whereby surfactants are used for making the water-in-oil emulsion. However, this leads to additional purification steps to remove the surfactant.

The use of organic solvents, surface-stabilizing agents, surface-modifying agents and surfactants makes these approaches inefficient, time-consuming, environmentally unfriendly, very costly, and unsuitable for large-scale production.

There is therefore a need to provide a method for preparing SiO_2-coated metal NPs and metal oxide NPs that overcomes or at least ameliorates, one or more of the disadvantages described above.

Summary

There is provided a method for synthesizing a SiO_2-coated nanoparticle, the method comprising the step of reacting a hydroxyl-functionalised silane with a nanoparticle in a substantially aqueous phase under conditions to induce silanization of the nanoparticle.

According to a first aspect, there is provided a method for synthesizing a SiO_2-coated nanoparticle, the method comprising the step of reacting a hydroxyl-functionalised silane having the following formula (I):

[Math. 1]

$$R^1\text{-}(CH_2)_n\text{-}Si(OH)_3 \quad \text{.....Formula (I)}$$

wherein

R^1 is selected from the group consisting of amino, glycidyl, mercapto and any mixture thereof; and n is an integer from 1 to 10; with a nanoparticle in a substantially aqueous phase and subsequently adding an aqueous ammonia solution under conditions to induce silanization of the nanoparticle.

Advantageously, the method enables a very simple, effective and low-cost aqueous approach for coating of SiO_2 on metal NPs and metal oxide NPs. The method may be carried out at room temperature, eliminating the need to elevate the reaction temperature for the reaction to proceed. Further, the reaction may be performed in the absence of organic solvents, making the reaction more environmentally friendly and more cost effective. Further advantageously, since an organic solvent is not required, the step of removing the organic solvent may be eliminated, and therefore there may be less steps involved in the synthetic procedure, making the method more time efficient as well.

Further advantageously, the method may be carried out in a substantially aqueous phase,

making the method environmentally friendly and more cost effective. More advantageously, the method may be carried out in substantially water. The substantially water may comprise substantially no organic solvents and substantially no dissolved solids. Further advantageously, since substantially water may comprise substantially no organic solvents, the step of removing the organic solvent may be eliminated. Further advantageously, since substantially water may comprise substantially no dissolved solids, the step of removing the dissolved solids may be eliminated. Advantageously, the substantially water may facilitate the reaction to be performed in a simpler, more environmentally friendly and cost-effective manner.

More advantageously, surface stabilizing agents or surface modifying agents may not be required in the method, further reducing the number of steps involved in the synthetic procedure by eliminating the steps required for removing such agents. In addition, since surface stabilizing agents or surface modifying agents may not be required, direct SiO_2-coating on the surface of the nanoparticle may be achieved by the method, unlike conventional methods which require