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E-101/28167/2015

PREPARATION OF NANOFLUID BASED ON CORE-SHELL FERRIMAGNETIC NANO-PARTICLES

ABSTRACT

The present invention discloses a composition of core-shell ferrimagnetic nanoparticles and a method of preparing core-shell ferrimagnetic nanoparticles with broad size distribution exhibiting high self-heating temperature rise and applications thereof. It further relates to the core of composite particles consisting of ferrites with trivalent ferric and bivalent magnesium, and their shell portion coated with polyethylene glycol, polyvinyl alcohol and, dextran. It further relates to the core-shell ferrimagnetic nanoparticles having an average diameter of 20-50 nm. It further relates to the application of these core-shell ferrimagnetic nanoparticles as in-vivo cancer hyperthermia agents.

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We claim,

1. A composition of core-shell ferrimagnetic nanoparticles comprising of a core of composite particles consisting of ferrites with trivalent ferric and bivalent magnesium, and a shell portion coated with polyethylene glycol, polyvinyl alcohol and, dextran or a combination thereof, with broad size distribution exhibiting high self-heating temperature rise and applications thereof.
2. A composition of core-shell ferrimagnetic nanoparticles of claim 1, wherein the said ferrimagnetic nanoparticles have an average diameter of 20-50 nm, the most preferable being 20 nm.
3. A composition of core-shell ferrimagnetic nanoparticles of claim 1, wherein the said core-shell ferrimagnetic nanoparticles are used as in-vivo cancer hyperthermia agents and are also used in several clinical treatment not limiting brain tumors, optic neuritis, cerebral nerve or a combination thereof.
4. A composition of core-shell ferrimagnetic nanoparticles of claim 1, wherein the said core-shell ferrimagnetic nanoparticles stand in the stoichiometric ratio of Mg nitrate: Fe (III) nitrate: glycine were hand mixed in proportion of 1 M:2 M::4.44 M.
5. A composition of core-shell ferrimagnetic nanoparticles of claim 1, wherein the said core-shell ferrimagnetic nanoparticles has moderate saturation magnetization, higher chemical stability, high colloidal

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stability, high biocompatibility and high self-heating temperature rise characteristics at physiological safe range of field and frequency.

Dated this 8th July, 2015

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