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(54) **Title:** WATER-SOLUBLE NANOCRYSTALS THROUGH DUAL-INTERACTION LIGANDS

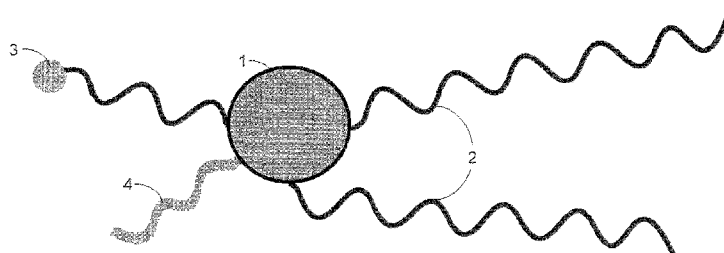


FIGURE 1

(57) **Abstract:** A dual-interaction ligand for rendering otherwise hydrophobic nanoparticles water soluble or suspendable has a hydrophilic base with a plurality of hydrophilic segments extending from a core of the base, where at least one segment or the core contains a hydrophobic groups capable of forming van der Waal interaction between hydrophobic groups of the dual-interaction ligand and other hydrophobic ligands, and at least one complexing functionality to complex a metal atom or ion of a nanoparticle. The dual- interaction ligands can be combined with hydrophobic nanoparticles. where the dual- interaction ligands can displace some or all of the hydrophobic ligands of the hydrophobic nanoparticles, to form a nanoparticle-dual interaction ligand complex that can be dissolved or dispersed readily in an aqueous solution. The dual interaction ligand can be functionalized to attach an antibody or other biomolecules such that the nanoparticle dual-interaction ligands complexes can contain biomolecules. Such biomolecules modified nanoparticle dual-interaction ligands can be used for sensing, labeling, optical imaging, magnetic resonance imaging, cell separation, and treatment of diseases.



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/032212**A. CLASSIFICATION OF SUBJECT MATTER****B82B 1/00(2006.01)i, B82B 3/00(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC C09K, G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models since 1975
Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & Keywords: ligand, hydrophilic, core, metal, hydrophobic, linking

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2001/0040232 A1 (BAWENDI, MOUNGI G. et al.) 15 November 2001 See abstract, FIG. 1	1-30
A	HONG, RUI et al., Surface PEGylation and Ligand Exchange Chemistry of FePt Nanoparticles for Biological Applications, 06 September 2005, Chem. Mater., Vol. 17, pp. 4617-4621 See Figure 1, Results and Discussion	1-30
A	YU, WILLIAM W. et al., Forming Biocompatible and Nonaggregated Nanocrystals in Water Using Amphiphilic Polymers, 14 March 2007, J. Am. Chem. Soc., Vol. 129, Issue 10, pp. 2871-2879 See Experimental Section, Figure 8	1-30
A	US 7,153,703 B2 (PENG, XIAOGANG et al.) 26 December 2006 See abstract, claims 1-23	1-30

 Further documents are listed in the continuation of Box C. See patent family annex.

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