

Self Assembly of Naphthalene Diimide Derivatives

International Patent Application.
PCT/IB2011/052939

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About Naphthalene Diimides

- Naphthalene Diimides are among the most promising n-type semiconductors for organic field effect transistors, supramolecular switches, fluorescent chemosensors, electron and energy transfer systems.
- Naphthalene Diimide (NDI's) possess excellent characteristics for the construction of artificial photosystems.
- Enhanced solubility of NDIs offers better processability over other aromatic imides.
- Among organic electronic materials 1,4,5,8-naphthalene diimides are attractive due to their n-type semiconductor property and air stability. These are compact electron deficient class of aromatic compounds having tendency to form n-type semiconductor materials.

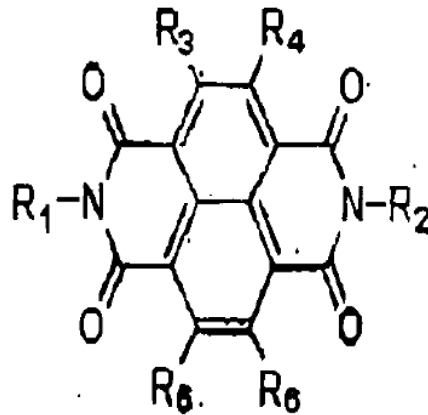
Inventors' Technology

The Proposed technology relates to a method of self assembling naphthalene diimide derivative into nano, meso, or micro structure comprises:

- Dissolving the naphthalene diimide derivative in a solvent to form a solution and
- Adding co-solvent to the solution of obtain the self assembled nano, meso or micro structures.

Technology also discloses the method using self assembled nano, meso, or micro structure of naphthalene diimide as an electronic device and as a biomaterial.

Self Assembled naphthalene diimide derivatives structure:



- Where R₁ and R₂ are selected from a group comprising of phenylalanine, tryptophan, methyl ester of phenylalanine, methyl ester of tryptophan and peptide containing phenylalanine or tryptophan or methyl ester of phenylalanine or methyl ester of tryptophan; R₃, R₄, R₅, and R₆ are cyclic, fused, or acyclic.

- **Unique advantage of using tryptophan:**

The choice of tryptophan as imide substituent is unique due to its polar carboxylic acid group, and an indole aromatic heterocycle offering both the hydrophilic and hydrophobic properties in a single moiety. In addition, tryptophan provides coordination sites for metal binding, flexibility to functionalizing and biocompatibility.

Patent Details:

[PCT/IB2011/052939](#)

- **Applications:**

Naphthalene Diimide derivatives have got wide range of applications in

- Biological
- Biomedical
- supramolecular chemistry
- As Intercalators of DNA, chemotherapy, conducting materials, optical brighteners, electrophotography, fluorescent labelling systems, metalomacrocycles, models for the photosynthetic reaction centre, sensors and anticancer agents.

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