

Accepted Manuscript

Luminescent one-dimensional nanostructures of perylene bisimides

G. Boobalan, P.K.M. Imran, S. Nagarajan

PII: S1386-1425(13)00491-5
DOI: <http://dx.doi.org/10.1016/j.saa.2013.05.010>
Reference: SAA 10532

To appear in: *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*

Received Date: 20 November 2012
Revised Date: 5 May 2013
Accepted Date: 6 May 2013



Please cite this article as: G. Boobalan, P.K.M. Imran, S. Nagarajan, Luminescent one-dimensional nanostructures of perylene bisimides, *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy* (2013), doi: <http://dx.doi.org/10.1016/j.saa.2013.05.010>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Luminescent one-dimensional nanostructures of perylene bisimides

G. Boobalan^a, P.K.M. Imran^b, S.Nagarajan*

*Department of Chemistry, Central University of Tamil Nadu, Thiruvavur- 610 004, India

^aDepartment of Chemistry, Annamalai University, Annamalaiagar 608 002, India

^bDepartment of Chemistry, Islamiah College, Vaniyambadi 635 731, India

Perylene bisimides form a unique class of organic semiconductors, in this investigation two symmetrical perylene bisimides capped with 1-butyl (B-PTCDI) and 4,4-diethoxybutyl (DB-PTCDI) have been synthesized and characterized. The compounds self-assembled as a network of nanobelts and nanorods in the solution based self-assembly process. Morphologies of these self-assembled structures were characterized by optical, fluorescence, scanning and transmission electronic microscopic techniques. One-dimensional self-assemblies of B-PTCDI and DB-PTCDI molecules are due to the strong π - π stacking ability of perylene core and assistance given by the side chains and solvent. Observed molecular self-assembly and electronic properties of the molecules. The observed self-assembly was supported by molecular modeling studies using density functional theory.

Keywords: Organic semiconductors; self-assembly; nanostructures; perylene bisimides; density functional theory.

1. Introduction

Design and self-assembly of organic molecules to form functional suprastructures is the main goal of supramolecular chemistry. During the past decade, the control of size, shape and crystal structure of organic functional materials has become the most highly energized research area for understanding their profound impact on chemical and physical properties [1, 2]. Self-assembly of nanometer-sized building blocks into ordered architectures at interfaces is an appropriate approach for efficient preparation of long-range ordered molecular aggregates and creating possible important materials with novel properties [3]. One-dimensional (1D)

Download English Version:

<https://daneshyari.com/en/article/7673614>

Download Persian Version:

<https://daneshyari.com/article/7673614>

[Daneshyari.com](https://daneshyari.com)