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研究论文

α-含氧取代酞菁的聚集性质研究

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摘要 以3-硝基邻苯二腈为原料分别与苯酚和甲醇反应合成3-苯氧基邻苯二腈和3-甲氧基邻苯二腈, 这些α-取代的邻苯二腈以二甲氨基乙醇为溶剂, 在有无醋酸锌条件下环合, 分别形成α-四苯氧基锌酞菁、α-四苯氧基无金属酞菁、α-四甲氧基锌酞菁、α-四甲氧基无金属酞菁, 对产物结构进行了表征. 光谱分析结果表明, 此类锌酞菁在氯仿等非配位溶剂中能自发形成J型聚集体, 其Q带出现一个红移吸收带, 经UV-Vis光谱、荧光光谱及MALDI-TOF质谱分析表明, 该聚集体的形成机理为基于酞菁分子间的锌-氧自配位相互作用.

关键词 α-含氧取代酞菁 J型聚集体 锌-氧自配位

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Studies on Aggregation Behavior of α-Oxygen-bearing Substituted Phthalocyanines

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Abstract 3-Phen/methoxyphthalonitrile was obtained *via* the reaction of 3-nitrophthalonitrile with phenol/methanol under the catalysis of anhydrous potassium carbonate. α-Aryl/alkoxy substituted phthalocyanines were synthesized by treating the corresponding substituted phthalonitriles in refluxing dimethylaminoethanol with or without metal acetate and were fully characterized by UV-Vis, ^{1}H NMR, MS spectra and elemental analysis. It was found that α-oxygen-bearing substituted zinc phthalocyanines 1 and 3 can form J-type aggregates easily in non-coordinating solvents. The MALDI-TOF MS for the samples of 1 prepared from chloroform solutions gives the monomer and aggregate signals. The aggregates are broken up when a coordinating solvent is added to the solution. A possible mechanism on the formation of this self-assembly was proposed, which it was driven by the complementary coordination of the ether oxygen in the aryl/alk-oxy groups of one molecule to the core Zn of another molecule of phthalocyanine.

Key words α-Oxygen-bearing substituted phthalocyanine; J-aggregate; Zn—O self-coordination

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