



High-Yield Synthesis of Metal-Free Phthalocyanines

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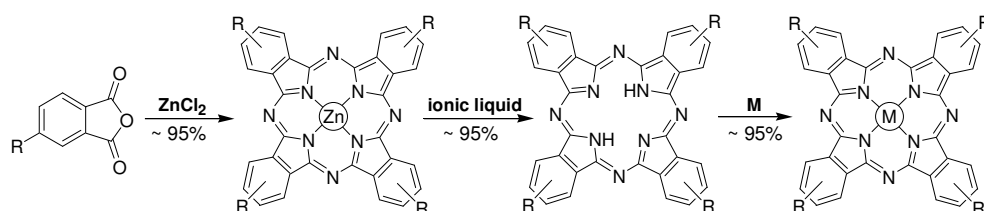
Reference in preparation

Background The remarkable photophysical properties and extreme chemical, thermal, and photostability make phthalocyanines (Pcs) ideal dyestuffs and useful components of synthetic catalysts, photovoltaic devices, chemical sensors and data storage devices. Pcs also have interesting in vivo applications as tattoo inks and sensitizers for photodynamic therapy.

Metal-free phthalocyanines are normally prepared from dicyano or diiminoisoindoline precursors, or from phthalic anhydride and phthalimide precursors by heating in the presence of a strong base. Only moderate yields can be achieved by using those synthetic routes.

It is well known that strongly chelating metal ion templates can dramatically improve the yields of cyclotetramerization using readily available starting materials. However, no conditions for the subsequent removal of such ions to generate metal-free phthalocyanines have previously been reported.

Invention A new demetallation reaction using ionic liquids is presented that provides Zn(II) removal for substituted and unsubstituted zinc phthalocyanines. Zn(II)-templated cyclotetramerization followed by Zn(II) removal, therefore provides a new high-yielding route to diverse, metal-free phthalocyanines. These products are, in turn, important starting materials for making Pcs with variable metal centers.



Fields of Use High yield synthesis of metal-free Pcs or Pcs with metal centers such as Cu, Co, Ni, Fe, Pd with applications e.g. dyes, photochemistry, catalysts.

Patent Status Patent filed

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