

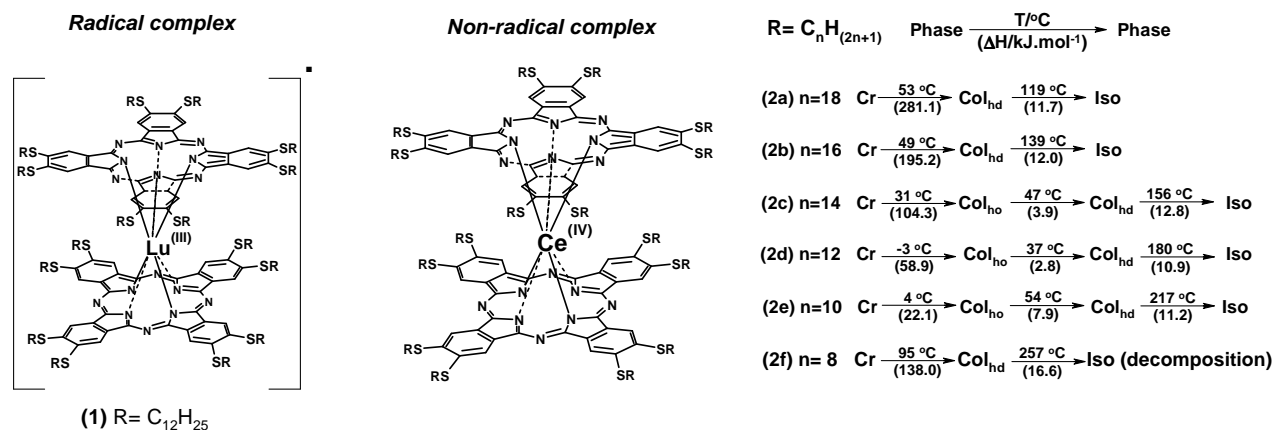
# Mesomorphic and charge transport properties of new double-decker cerium phthalocyanine complexes

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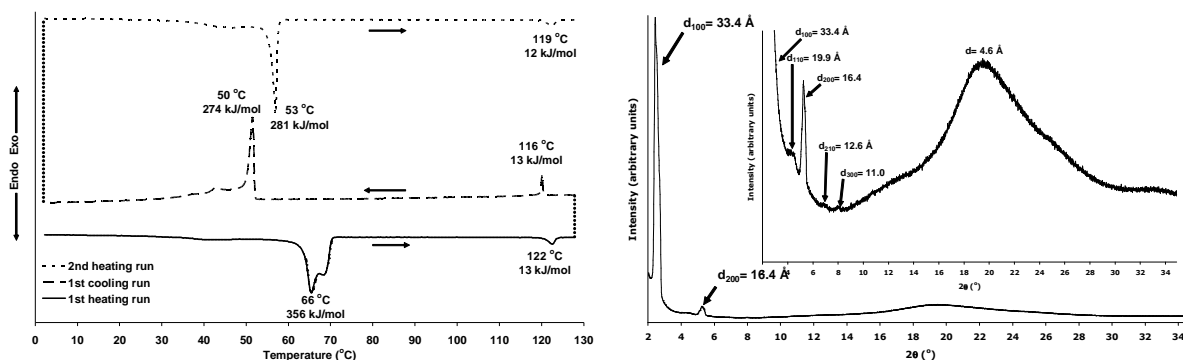
Liquid crystalline metallophthalocyanine materials have been much studied over the last two decades in the search for new electronic materials.<sup>1,2</sup> Indeed, their arrangement as columnar stacks of cofacial molecules in the mesophase makes them an attractive candidate for conductive materials with one-dimensional conduction pathway.<sup>3,4</sup> One of the best reported semiconducting material so far is the lutetium double-decker complex (**1**) (Scheme 1), which showed carrier mobilities as fast as  $0.7 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$  in their columnar mesophases by pulse-radiolysis time resolved microwave conductivity technique.<sup>5</sup> Nevertheless, no spontaneous or controllable alignment of the molecules on a substrate, which is an important factor for device fabrication, could be achieved for this compound.



**Scheme 1:** Lutetium and cerium phthalocyanine double-decker complexes.

We have recently reported the preparation of a new double-decker cerium phthalocyanine mesogen bearing thioalkyl substituents (**2a**) (Scheme 1).<sup>6</sup> Unlike other lanthanide phthalocyanine complexes,<sup>7</sup> the cerium ion was found to be tetravalent and both phthalocyanine ligands dianionic in this compound. As a consequence, the stability of the hexagonal columnar mesophase (Figure 1) is enhanced as compared to those of the radical lanthanide phthalocyanine mesogens.<sup>5</sup> Moreover, spontaneous alignment of the hexagonal columnar mesophase on glass substrate could be achieved thus allowing the drift mobility measurements of this material as a thin film by Time Of Flight (TOF) technique.

We will present our recent results on the syntheses, thermotropic mesomorphism and alignment behaviour on different surfaces of a homologous series of (**2a**) having different alkyl chain lengths. The charge carrier mobility measurements by TOF for compound (**2a**) will also be described.



**Figure 1:** DSC thermogram and X-Ray diffraction pattern at 80 °C of (2a).

## References

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