

DESIGN OF HIGH COORDINATION NUMBER METALLOMESOGENS BY DECOUPLING OF COMPLEX-FORMING AND MESOGENIC GROUPS

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Liquid-crystalline complexes of rhenium(I), yttrium(III), lanthanum(III), neodymium(III), samarium(III), europium(III), erbium(III) and ytterbium(III) were obtained by coupling mesogenic 4-cyanobiphenyl groups with a long alkyl spacer to a substituted imidazo[4,5-f]1,10-phenanthroline, which acts as the coordinating group. In the case of the rare-earth complexes, 2-thenoyltrifluoroacetate was used as the co-ligand. All the rare-earth complexes exhibit a nematic phase, whereas the rhenium(I) complexes show a nematic, a smectic C, or a lamello-columnar phase, and the imidazole-bearing phenanthroline ligands a nematic or a smectic phase, depending on the number of attached mesogenic groups. The phase structure of the smectic and lamello-columnar phase is discussed and described on the basis of both X-ray data and dynamic molecular modeling. The lanthanide complexes are highly luminescent in the solid phase and as a solution in a nematic liquid crystal host (5CB). This approach can be generalized to obtain other high coordination number metallomesogens.

