METAL COMPLEXES WITH LIGANDS CONTAINING DIMETHYLSILOXANE UNITS: SELF-ASSEMBLING ABILITY

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The presence of strongly hydrophobic dimethylsiloxane units as part of a structure could give to its more or less amphiphilicity, depending on the nature of the rest of the molecule. The co-existence of hydrophobic and hydrophilic moieties within the same molecule of a compound essentially contributes to their self-aggregation in solution forming nano-aggregates or nano-particles [1]. The self-assembly of amphiphiles is driven by forces, which act to minimize the contact between the solvent and the solvophobic segment of the molecule [2]. In the case of metal complexes, specific behavior may occur due to the presence of metals, which are able of additional coordination or metal–metal interactions. As a result, some novel properties can be expected from their aggregates due either to the metal presence or related to the structures of metal complexes, such as the variable bonding strength of metal coordination interactions, coordination geometry variation and metal–metal interactions [2]. The association occurring in solution may be the basis for high catalytic activity of metal complexes with siloxane-containing ligands, as has already been demonstrated [3].

The aggregation ability in DMF solution of some new metal complexes of bis(azomethines) or telechelic dicarboxylic acids containing 1,3-bis(propyl)tetramethyldisiloxane moiety have been studied [4]. The aggregation in organic solvents was studied by surface tension measurements, dynamic light scattering (DLS), small angle X-ray scattering (SAXS) and differential scanning calorimetry (DSC) in solution. The morphology of the drop cast or spin-coated films was studied by transmission electron microscopy (TEM) and atomic force microscopy (AFM).

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