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Thermodynamics of lanthanides(III) complex formation with nitrogen donor ligands in DMSO.

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The complex formation between lanthanides(III) and ethylenediamine in the aprotic solvent DMSO has been studied.

The investigation has been carried out at 25°C and in an ionic medium 0.1 M with Et_4NClO_4.

The stability constants, and therefore the free energy changes, of the complexes have been determined by means of potentiometric measurements using the method of the competitive reactions: silver(I) was the auxiliary central ion.

The enthalpy changes for the complexes have been determined by direct calorimetric titrations.

The formation in solution of the thermodynamically stable complex species is favored by a negative enthalpy change as the entropy change is also negative.

The results are discussed in terms of solvation of the species involved in the complex formation and compared to the data obtained for the same systems in aprotic solvents of different coordinating properties.

Comparisons are also made with the thermodynamic parameters obtained for the uranium(VI) complexes with the same ligand in DMSO.