studies chelation and micro deternination of some rare el ements with some oranic compounds

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l-In the first chapter, a literature survey of the previous studies on Schiffbases and their complexes with different metal ions is given. This surveyincludes spectrophotometric, potentiometric, conductometric andpolarographic studies on Schiff bases and their chelate&. It includes alsothe use of some Schiff bases as analytical reagents for detection anddetermination of lanthanide and transition metal ionaspectrophotometrically and polarographically .2- The experimental part (chapter II) includes the preparation of the Schiffbases under investigation. It compriaes also information about theinstruments used for spectrophotometric, potentiometric,conductometric, polarographic, ir,1H-nmr, epr, magnetism as well aathermal analysis measurements.3- Chapter III includes the results and discussion and consists of two parts,the first part (A), includes the studies in solutions of complexes formedbetween Schiff bases under investigation with lanthanide ions3+ 3+3+ 3+ •• 2++ 8+(La ,Sm ,Eu and Gd) and trans1tion metal ions (Cu Ag and Au).The studies include conductometric, potentiometric, spectrophotometricand polarographic techniques. from conductometricmeasurements the stoichiometry of the different complexes is obtained .P . . . . f s hiff b d La3+ s 3+ 3+ Gd3+ c 2 otentiometnc titration o c · ases an , m ,Eu , . u + ,Ag +3+and Au ions are performed in a medium of perchloric acid and sodiumperchlorate. The proton-ligand stability constants log K8 are determined aawell as the formation constants of the complexea log Kw .from the dataobtained from the polarographic study of the complexes of Sm S+ ,Eu 3+ ,and3+Gd with all ligands in NaC104 solutions containing 30% (v/v) ethanol, thevalues of the stability constants of metal complexes are given. Thestoichiometry and stability constants of metal complexes are also evaluatadfrom spectrophotometric methods namely the molar ratio, straight line andcontinuous variation methods. The optimum conditions for the complexformation are investigated, universal buffer of 30% (v/v) ethanol waa foundto be the best medium for spectrophotometric studies. Optimum pH values,suitable wavelength, effect of time and temperature as well as the sequenceof addition were also studied. The results obtained indicate that asatisfactory agreement is observed between stability constant valuesevaluated using the three different methods.4- Part (B) of chapter (III) includes studies of the solid chelate& whichinclude elemental analysis, molar conductivity measurements, TGA,DTA.ir,1H-nmr, electronic absorption spectra, epr and

magneticmeasurements.The molar conductance of the complexes in DMF showthat these chelates are electrolytes in nature and display differentoxidation states, The chemical formula of the solid chelate& weredetermined using the data obtained from thermal methods of analysis(TGA and DT A) as well as dehydration and elemental analysis . The irspectraof the metal chelates are studied and compared with those of thefree ligands which indicate that the coordinate and covalent bonds occurthrough the nitrogen atom of the azomethine group and the oxygen atomof the hydroxyl group of the salicylidene part of the molecule respectively.Their· spectra of the metal chelate& exhibit a very broad band at high·1 frequency (3300·3450 em) which is due to the water moleculescoordinated to the central metal ions.1 3+ •.The H-nmr spectra of La _ chelates with the ligands underinvestigation were studied in DMSO and compared with those of the freeligands. The main signals due to the proton of the phenyl ring, CH, CH2 andOCH3 groups are detected. It is found that the signals of protons of the OHgroup of the salicylidene part were completely disappeared indicating thecontribution of this OH group in chelation through proton displacement.2+The magnetic susceptibilities of some representative solid Cu •chelates are measured using the Gouy method , from which the magneticmoments (Jl.IT) and the number of unpaired d-electron in the Cu2+ -ion aredetermined . The stereochemistry of these chelates were then detected usinarPauling’s theory.The absorption spectra of the solid chelates are studied in both nujolmull and DMF.The variation of the position of the CT band in the two mediaindicates the variation of the environment of the central metal ion in DMFsolution than in solid state. Some new bands are observed which areassigned and related to the spin allowed d-d transition for transition metalion or f··f transition for lanthanide metal ions. The CT band due to L-.M orM-.L transition appears at longer or shorter wavelength to CT band of theligand confirming the interaction between the metal ions and the ligands .The epr spectra of some chelates of Cu 2+ metal ions and ligands arerecorded . The calculated G-values indicate that the ligands environment isthe_samElfor Cu2+ metal ions.5- Chapter (N), includes the analytical microdetermination of lanthanide3+ 3+ 3+ 3+ 2+, +ions (La , Sm , Eu and Gd) and transition metal ions (Cu Ag and3+Au) with Schiff bases under investigation using thespectrophotometric techniques (calibration curve, EDTA titration andRlngbom method). It includes also the use of such compounds in thepolarographic microdetermination of metal ions under consideration.