

Past and Present Research Systems of Green Chemistry

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Recent developments of the fixation of atmospheric CO₂ by transition metals and lanthanide complexes

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The chemical fixation and activation of CO₂ by metal complexes may lead to certain devices that can eliminate the CO₂ present in the air and hence controlling its concentration and reducing the environmental problems due to the greenhouse effect and global warming. This can be achieved by designing “*inexpensive inorganic compounds*” that rapidly and effectively catalyze the atmospheric CO₂ fixation. In slightly basic solutions, the atmospheric fixation of CO₂ by metal complexes, through hydroxo-species, afford the carbonato metal complexes. A number of simple N-donor ligands and multi-dentate Schiff bases containing two or three N-atoms, phenolic and alkoxy groups are used to synthesize a series of 3d(M(II) = Ni, Cu, Zn) and 4f(Ln(III) = lanthanides) complexes. The incorporation of lanthanide (III) ion into the skeleton of 3d complexes to produce 3d-4f heteronuclear metal complexes should increase the affinity of the compounds for CO₂ fixation into the Ln (III) pocket (Ln³⁺ ion is a hard Lewis acid which strongly bound to hard Lewis bases; O-donor species such as CO₃²⁻ ion). The carbonato complexes are not only interesting from the structural and geometrical points of view, but also may result in the discovery of interesting Single Molecular Magnets (SMM's) which can be used to increase the memory of the computers. The resulting carbonato-bridged compounds can also be used to prepare some useful organic compounds. Recent developments concerning synthesis and structure characterization of different coordination carbonato-bridged compounds, magnetic properties and their potential applications will be addressed.

Biography

Salah S Massoud received his PhD from Boston University and has Postdoctoral studies at Basel University (Switzerland), University of Alberta (Canada) and visiting Professor at Ohio and Houston Universities. He has published more than 135 papers in reputed and peer-reviewed journals and has been serving as an Editorial Board Member of *Magnetochemistry Journal*, *Journals of Advances in Chemistry and Modern Chemistry and Applications (JMCA)* and *Dataset Papers in Materials Science*.

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