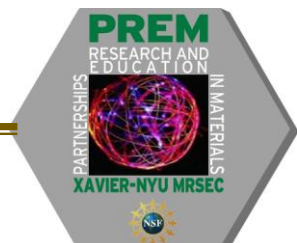


Synthesis, structure and properties of metal galactarates as precursors for novel functional materials

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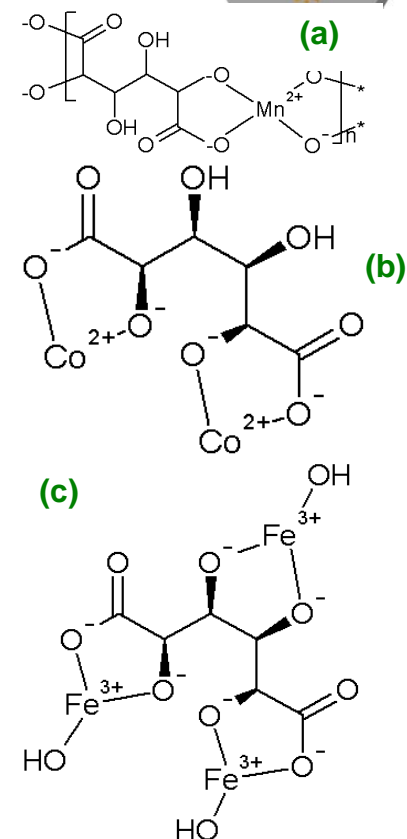


Divalent metal ions (Mn, Fe and Co) in acidic or neutral solutions produce insoluble galactarates of 1:1 stoichiometry. Crystal and molecular structure of Mn(II) galactarate was determined as consisting of coordination polymer chains with alternating metal ions and bridging ligands (Figure a). Manganese ions are located in centers of pentagonal bipyramids of oxygen atoms, which is an unusual arrangement.

The same divalent metal ions in basic solutions produce soluble galactarates of the metal to ligand stoichiometry 2:1 and with hypothetical formula $M_2H^{\beta}_2G$ or $M_2(OH)_2H^{\beta}_2G_2^-$ (Figure b). These compounds are oxygen-sensitive; their spontaneous oxidation leads to new series of complexes with composition $M_3G(OH)_3$ and $M_3G(OH)_4^-$ containing metal(III) and hexa-deprotonated ligand (Figure c):



Iron complex forms directly from $Fe(H_2O)_6^{3+}$:



Structural motifs of novel complexes with Mn, Fe and Co