

COORDINATION CHEMISTRY

By Vidya Kamath



Coordination sphere

Ionisable ion

Central metal ion

Ligands

Coordination number

VALENCE BOND THEORY

Central metal /atom	$[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$ Co(III)
Electronic configuration	<p>Co: $3d^7$ $4s^2$ $4p$</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">↑↓</div> <div style="border: 1px solid black; padding: 2px;">↑↓</div> <div style="border: 1px solid black; padding: 2px;">↑</div> <div style="border: 1px solid black; padding: 2px;">↑</div> <div style="border: 1px solid black; padding: 2px;">↑</div> <div style="border: 1px solid black; padding: 2px;">↑↓</div> <div style="border: 1px solid black; padding: 2px; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; padding: 2px; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; padding: 2px; width: 20px; height: 20px;"></div> </div> <p>$\text{C}_2\text{O}_4^{2-}$ is a strong field ligand.</p> <p>$3d^6$ $4s^0$ $4p$</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">↑↓</div> <div style="border: 1px solid black; padding: 2px;">↑↓</div> <div style="border: 1px solid black; padding: 2px;">↑↓</div> <div style="border: 1px solid black; padding: 2px; width: 15px; height: 15px; text-align: center;">x</div> <div style="border: 1px solid black; padding: 2px; width: 15px; height: 15px; text-align: center;">x</div> <div style="border: 1px solid black; padding: 2px; width: 15px; height: 15px; text-align: center;">x</div> <div style="border: 1px solid black; padding: 2px; width: 15px; height: 15px; text-align: center;">x</div> <div style="border: 1px solid black; padding: 2px; width: 15px; height: 15px; text-align: center;">x</div> <div style="border: 1px solid black; padding: 2px; width: 15px; height: 15px; text-align: center;">x</div> </div>
Geometry	Inner orbital (low spin) complex
Hybridization	Octahedral
Number of unpaired electron	d^2sp^3
	$n = 0$; DIAMAGNETIC