

## Smart Sensing of Alcohol Vapours with a Molybdenum Coordination Complex

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The detection of alcohol is essential in fields ranging from healthcare to industrial safety and forensic analysis. Coordination complexes (comprising transition metals and organic ligands) have emerged as protentional candidates for chemical sensing applications due to their electronic and optical properties. In the last decade these systems have been explored as alcohol sensors. Although the use of coordination complexes for alcohol detection remains rather underexplored compared to metal oxides or conducting polymers, recent advances demonstrate their potential in offering rapid, reversible, and selective sensing capabilities. The sensing mechanism typically involves changes in conductivity and/or colour upon alcohol exposure, enabling both qualitative and quantitative detection.

In the present study, a molybdenum coordination complex was used as the sensor material. The Schiff base ligand was synthesized via the condensation of *o*-vanillin and oxalyldihydrazide, then coordinated to a  $[\text{MoO}_2]^{2+}$  core. This synthesis, performed in methanol, resulted in the formation of the complex  $[\text{Mo}_2\text{O}_4(\text{L})(\text{MeOH})_2] \cdot 2 \text{H}_2\text{O}$ . The complex was exposed to methanol and ethanol vapours, leading to desolvation and decoordination of the solvent molecules with subsequent coordination of the vapor molecules. Characterization of the complex was performed using attenuated total reflectance infrared spectroscopy (IR-ATR) and thermogravimetric analysis (TGA). Impedance spectroscopy (IS) was used to confirmed structural changes and to measure the conductivity response.