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Theory of solids/gas mixtures multi-interfaces: Application to the steady state interactions between a sensor array based on metal oxide semiconductor detectors and a mixture of vapours

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Abstract: The aim of this paper is to find useful relationships in differential form that describe the isothermal steady state interactions between a sensor array based on metal oxide sensors and a mixture of vapours. These equations of state relate the variation of partial molar intensive quantities (as the change of the sensor molar partial sensitivity or molar adsorptions enthalpy), to gas mixture components concentrations and sensor array parameters. This kind of equalities is known in the thermodynamic of miscellaneous as Gibbs–Duhem equations.

Keywords : Metal oxide sensors, Gas mixtures, Freundlich adsorptions isotherm, Sensitivity, Selectivity, Gibbs–Duhém equations, Adsorptions enthalpy change