Method for testing the efficiency of gas multi-sensors

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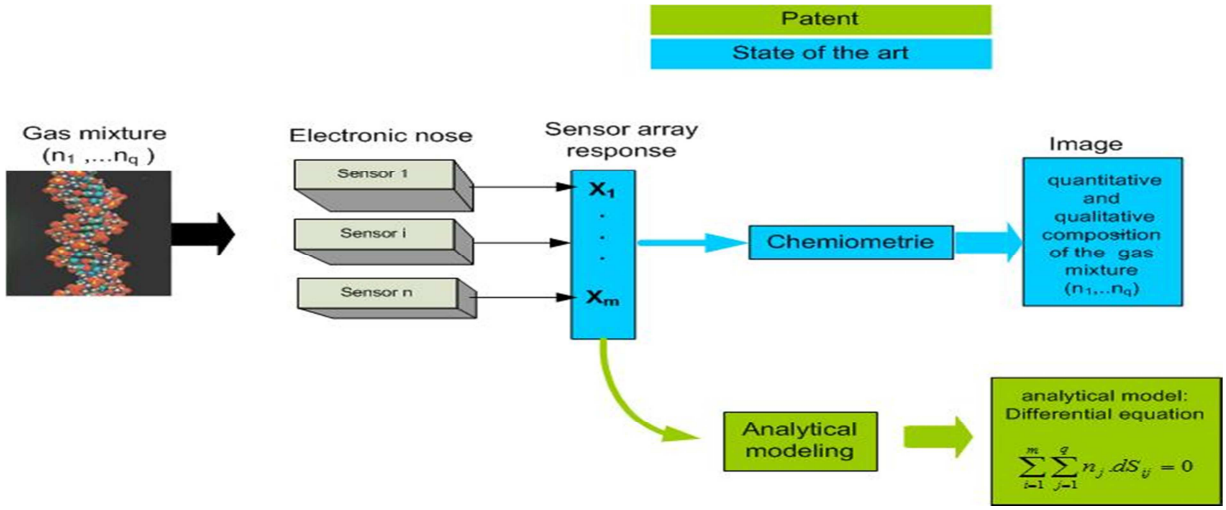
Purpose of the invention

An electronic nose is able to analyze a gas mixture qualitatively and quantitatively (regardless of its complexity) .It is highly sensitive (can detects concentrations of the order of ppm and ppb). He gives an image, at the output, of the gas mixture composition (concentrations or partial pressures of the gas mixture components). Since the multi-sensor is an electronic instrument, it is subjected to drifts, and gives wrong responses. In order to ensure the proper functioning of this device, it must re-calibrated every time. We suggest here a possibility for checking the proper functioning of chemical sensors, that is to say to verify their reliability, stability, the drift existence etc. and therefore to avoid or at least to reduce the frequency of calibrations.

The models are all first theoretical and require experimental verification. This will be provided in another potential Patent. However they were validated through publications in journals with a high impact factor. The fact that they are online accessible requires protection of these inventions, pending further proceedings.

Description of the invention

The response of a multi-sensor consisting of n resistive sensors, when interacting with a mixture of q gas, depends not only on the composition of the gas mixture (concentrations of the mixture components) and temperature but also on the sensitivities of the sensor array elements. Based on the facts that the responses of a chemical sensor in general and specially those of resistive sensor are state function , the application of Gibbs-Duhem formalism on the multi sensor responses allowed us to deduce relationships similar to those of Gibbs-Duhem . The responses of sensor array elements are commonly treated by chemo metric methods and give an image of the analyzed odor at the output. We used analytical methods and we developed models that can check the consistency of experimental results.



The derived models are equations in differential form ,which connect the number of moles nj of the mixture component j to the partial sensitivities sij of the ith sensor array element, when it interacts with the j constituents of the gaseous mixture.