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Sensors for the detection of hazardous emissions

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This contribution will detail recent developments in sensor technology for the detection of hazardous emissions. The accurate measurement of such emissions is necessary if they are to be controlled to the appropriate regulations; this latter topic is the subject of a related contribution at the colloquium (Hazard emissions monitoring and control).

Firstly, recent developments in gas analysers will be outlined, to measure, for example, reactive and condensable gases such as HCl, NH_3 and formaldehyde [1], [2]. The measurement of emissions of other harmful pollutants (such as NO_x, for example) is also increasingly important; such measurements are required in steam power plants, for example, in which heat is used to create steam, which, in turn, spins a turbine generator that creates electricity. The heat used to convert water to steam most commonly comes from the burning of a carbon based fuel, such as natural gas or oil; emission of pollutants are the inevitable result. NO_x emissions cause a wide variety of health issues, such as respiratory damage from the resulting particles, and environmental problems, such as ground level ozone (smog), acid rain, water quality deterioration and global warming [3]. Sensors to measure NO_x emissions will be treated in detail [3-6].

However, online measurement devices can be costly. An alternative is to use "virtual sensors", in which variables are estimated based on their correlation with other, more easily measured, quantities [7-8]. The contribution will conclude by considering such sensors.

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