Development of a Non-Dispersive Infrared Multi Gas Analyzer for a TMS

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Abstract : A Non-Dispersive Infrared (NDIR) multi-gas analyzer has been developed to monitor the emission of carbon monoxide (CO) and sulfur dioxide (SO2) from various industries. The NDIR technique for gas measurement is based on the wavelength absorption in the infrared spectrum as a way to detect particular gasses. NDIR analyzers have popularly applied in the Tele-Monitoring System (TMS). The advantage of the NDIR analyzer is low energy consumption and cost compared with other spectroscopy methods. However, zero/span drift and interference are its urgent issues to be solved. Multi-pathway technique based on optical White cell was employed to improve the sensitivity of the analyzer in this work. A pyroelectric detector was used to detect the Infrared radiation. The analytical range of the analyzer was 0 ~ 200 ppm. The instrument response time was < 2 min. The detection limits of CO and SO2 were < 4 ppm and < 6 ppm, respectively. The zero and span drift of 24 h was less than 3%. The linearity of the analyzer was less than 2.5% of reference values. The precision and accuracy of both CO and SO2 channels were < 2.5% of relative standard deviation. In general, the analyzer performed well. However, the detection limit and 24h drift should be improved to be a more competitive instrument.

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