

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.

Keywords : analyzer, CEMS, monitoring, NDIR, TMS

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