

Unfolding of a membrane divided filter press flow cell towards online air pollutant monitoring during electrochemical removal at electroscrubbing process

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In gas sensor development, low detection limit were focused and many electrochemical gas sensor are in practice for several pollutant gases but, in-situ electrochemical gas sensor during pollution degradation plant still under development stage. In the present investigation, ring type membrane divided flow cell was developed and optimized on CO₂ gas sensing during its removal at electroscrubber. Nafion324 divided electrolytic cell with 0.1 M NaSO₄ liquid electrolyte filled at anodic half-cell and gas phase cathodic half-cell. Different types of cathodes such as oxide electrodes, Co-phthalocyanine/ionic liquid or Nafion coated electrodes were tested to optimize the cell. Based on the cyclic voltammetry and linear sweep voltammetry analyses, the gas phase redox peak was fixed for detection of CO₂ gas. The redox peak current with different feed concentration were compared with in-situ FTIR gas analyzer concentration and derived calibration plot. Finally, the CO₂ removal by electroscrubbing process monitored using the optimized gas flow sensor cell and compared with FTIR data.