Chun-Ling Chang et al., Chem Sci J 2017, 8:4 (Suppl)
DOI: 10.4172/2150-3494-C1-015

Gas permeation through micro-pores membranes for direct analysis of metal by spICP-MS

Chun-Ling Chang, Yi-Hung Liu, Fang-Hsin Lin and I-Hsiang Hsu
Industrial Technology Research Institute, Taiwan

Process gases, such as ammonia, carbon dioxide, di-nitrogen monoxide and carbon tetra-fluoride, are widely used in semiconductor processing. On line monitoring the particulate contamination of the delivered gases is important challenge. The technique of single particles Inductively Coupled Plasma Mass Spectrometry (spICP-MS) was recently applied to particle analysis and numerous studies have established a set of metrological criteria of spICP-MS for sizing or quantifying various types of nanoparticles. In the technique, the working gas of argon is chosen as the carrier gas. To prevent the plasma quenching, a Gas Exchange Device (GED) was applied to remove the gas matrix. The gas converter consists of two concentric tubes in this study: A porous PTFE inner tube and a PFE outer tube. The aerosol sample flows in the inner tube and the clean argon gas flows in the outer tube. Because there is partial pressure difference on both sides of the inner tube, the carrier gas and the argon could penetrate the porous membrane and exchange. This research used Fourier Transform Infrared Spectroscopy (FTIR) as gas concentration analyzer of inner and outer tube for optimized the dilution rate of gas exchange device. We used GED to optimized four difference components such as NH_3, CO_2, N_2O and CF_4. Results show that CF_4 compare with the other three components need largest outer tube flow rate. The permeability of the process gases were shown to be in order $NH_3>CO_2>N_2O>CF_4$. The order was in accordance with molecular weight of component.

Biography

Chun-Ling Chang is currently working on specialty gas concentration analysis, dynamic gas concentration generation and the performance testing of gas analysis.

jennachang@itri.org.tw

Notes: