QCM-bases Adsorption Sensors Coated with Functional Polymers for CO_2, SO_2 and NO_2

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In this work, QCM-based array adsorption sensor system coated with functional polymers such as polypyrrole, PEDOT, polystyrene (PS), polyisobutylene (PIB) were developed for adsorption of CO_2, SO_2 and NO_2 at room temperature in vacuum condition. Sensing films were coated onto quartz piezoelectric using by spin coating for 30s. The loading mass of polymers coated on QCMs were about 4000~ 5000ng. The morphology and characteristics of the sensing polymers coated with quartz crystals were investigated by AFM and FE-SEM. The frequency shifts change of the QCM by adsorption and desorption of gases are measured and analyzed to assess the practical applicability of the sensor system. The results showed that the Ppy coated with quartz crystal have high sensitivity, good stability and short response/recovery time at SO_2. The other hands, PEDOT have high sensitivity for NO_2 and CO_2 than other polymers.