

Rational Design of Aminopolymer for
Air Pollutants Detection

조수연, 조경민¹, 정상규¹, 김지한¹, 정희태^{1,†}

한국과학기술원; ¹KAIST

(heetae@kaist.ac.kr[†])

Acidic gases such as CO₂, SO₂, and NO₂ are harsh air pollutants with major human health threatening factors, thus, developing new tools to monitor these gases are critically required. However, it is very difficult to selectively detect the acidic air pollutants due to the similar chemistry shared by acidic and oxidizing molecules. In this work, three acidic gases are selectively detected with precise chemical moiety design. By changing the composition ratio of primary, secondary, and tertiary amines of polyethyleneimine (PEI), unprecedented high selectivity between CO₂ and SO₂ is achieved. Using in-situ FT-IR, distinct adsorption phenomenon of acidic gases on each amine moiety is precisely demonstrated. Our approach is the first attempt at controlling gas adsorption selectivity of solid-state sensor via modulating chemical moiety level within single channel material. In addition, discrimination of CO₂, SO₂, and NO₂ with single channel material solid-state sensor is firstly reported.