



Continuous flow analysis of ammonia using gas diffusion and polypyrrole-modified electrode

Jarita Klunghirun^{1,2}, Walaiporn Prissanaroon-Oujai¹, Chatchalida Boonpanaid^{1,2*}

¹*Department of Industrial Chemistry, Faculty of Applied Science,
King Mongkut's University of Technology North Bangkok, Bangkok 10800 Thailand,*
²*Flow Innovation-Research for Science and Technology Laboratories (FIRST Labs),
Bangkok, Thailand*

*e-mail: chatchalida.b@sci.kmutnb.ac.th

Determination of ammonia by continuous flow system consisting of a membraneless gas separation unit and a polypyrrole electrode was investigated in this work. Ammonia was liberated from sample by sodium hydroxide injection then absorbed into an acceptor solution. Polypyrrole was immobilized by enzyme urease and utilized as a potentiometric sensor to detect ammonium in carrier solution, revealing the linear concentration range of 0.05-10 mM NH₄⁺. Bromothymol blue, carrier solution transformed proportionally to ammonia concentration from yellow to blue. Limit of detection by the polypyrrole sensor and spectrophotometer in the flow system were 0.05 and 0.76 mM NH₄⁺, respectively. Determination of ammonia in aluminum dross was investigated by both techniques, showing not significantly different results which were 36.93 and 37.29 mM NH₄⁺ per gram sample for polypyrrole sensor and spectrophotometer respectively.

Keywords: Polypyrrole electrode, flow injection, ammonia sensor, membraneless gas diffusion unit