ABSTRACT

One popular method with wide applications is membrane-based separation technology as a solution for treating wastewater. One 2D material, Graphene Oxide (GO), has become a popular material for use as a filler in composite membranes. The combination of a PVA (polyvinyl alcohol) matrix with GO forms a polymer-inorganic hybrid composite that can increase separation effectiveness in pressure-driven membrane processes for aqueous systems. Surface modification of membranes with photocatalytic materials such as copper sulfide is an alternative to overcome fouling problems with a self-cleaning method. In this study, a PVA/GO/CuS membranes was fabricated and characterized using FTIR, XRD, SEM-EDX mapping, and UV-Vis DRS to evaluate its structural, morphological, and optical properties. UV-Vis spectrophotometry is used as an instrument to assess the rejection performance of Remazol Black B dye. The results revealed that the PVA/GO/CuS membranes exhibited high rejection efficiency, with the PVA/GO/0.1CuS membrane achieving the highest rejection of 97.2%, followed by 96.9% for PVA/GO/0.05CuS and 91.1% for PVA/GO/0.2CuS. The photocatalytic activity of copper sulfide with a band gap of 1.6 eV, contributed to improvement of antifouling properties through self-cleaning mechanisms, supporting its role in achieving excellent rejection performance.

Keywords: *Graphene Oxide (GO), Polyvinyl Alcohol (PVA), Copper Sulfide, Composite Membranes*