GRAPHENE OXIDE / REDUCED GRAPHENE OXIDE MIXED MEMBRANE FOR IMPROVING WATER PERMEATION

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Abstract - Aquaporin is a kind of membrane protein distributed on the cell membrane, which is a channel that moves water molecules into the cell at high speed. The inside of the aquaporin has the shape of an hourglass, and the NPA motif and ar/R region inside the aquaporin can selectively transport water molecules at high speed. Materials with Hydrophilicity/hydrophobicity are distributed throughout the aquaporin channel, providing a driving force to move water molecules at high speed. Just as N-poles and S-poles alternately placed on the rails of magnetic levitation trains to provide propulsive force to magnetic levitation trains, it provides the driving force to move the water molecules entering the aquaporin. In this study, hydrophilicity and hydrophobicity were simulated with Graphene Oxide and reduced Graphene Oxide, respectively. GO flakes and rGO flakes are mixed to form a solution, and the membrane is formed on the AAO substrate by vacuum filtration. Hybrid membrane of GO flake and rGO flake allow to pass the regions of hydrophilicity and hydrophobicity when the water molecules passes through the membrane. The water permeation rate was measured and it was confirmed that the water permeation rate was increased with increasing rGO percentage.

Index Terms - Aquaporin, Graphene Oxide, reduced Graphene Oxide, water