ADVANCES IN GAS FILTRATION MATERIALS RESEARCH: FUEL CELL AIR PURIFICATION CHALLENGE?

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In this talk recent advances and challenges in gas filtration materials development research will be discussed. Emphases will be placed on evaluating the suitability of the advanced sorbent material classes in fuel cell air filtration application. The potential of both the reversible and non-reversible gas sorbent materials to meet fuel cell air filtration needs under various environmental conditions will be discussed. This talk is motivated by the detrimental effects of gaseous air contaminants such as sulfur dioxides and hydrogen sulfide, which hinder the direct use of unpurified air in polymer electrolyte membrane fuel cell technologies. The gaseous air contaminants react with fuel cell components such as Pt catalyst, greatly inhibiting efficiency of the fuel cell. A majority of the state of the art acidic gas air contaminant mitigation strategies are based on non-regenerable absorbents. This talk will also focus on our research efforts to develop nano confined ionic liquids, metallo ionic liquid and ionic solids as high performance sorbents for the acidic gases.