

Anaerobic digestion gas pretreatment for fuel cell applications

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Anaerobic digestion gases consist primarily of CH_4 , CO_2 , plus trace amounts of sulfides, organic halides and non-methane hydrocarbons. The specific contaminants in the anaerobic digestion gas of concern to the fuel cell are sulfur and halides. Both of these ingredients can 'poison' and therefore reduce the life of the power plant's fuel processor. The fuel processor is the unit which converts CH_4 in the gas stream into H_2 and CO_2 over a catalyst bed. The catalyst in this bed can react with the halides and sulfides and lose its activity. Hydrogen sulfide is removed by adsorption on a packed bed. To improve their fixation capacity toward sulfur compounds the activated carbons are impregnated in an aqueous solution of potassium iodide and potassium hydroxide. Physical properties of the potassium iodide and potassium hydroxide impregnated activated carbons were characterized by N_2 adsorption experiment. Adsorption dynamics of sulfur compounds on potassium iodide and potassium hydroxide impregnated activated carbon were investigated.