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ASPEN HYSES V8.8 Design for the simultaneous removal of thiols, hydrogen sulfide and carbon dioxide from natural gas stream using DEA + MDEA + Piperazine aqueous solutions

Natural gas and petroleum industries are dealing with raw materials containing variable concentrations of acid gases (CO2, H2S) and traces of mercaptans and dimethyl disulfide and many others. Treatment processes have to remove not only H2S and CO2 but also OSS and prohibited compounds because worldwide regulations for environmental protection are forcing the petroleum industry to decrease the sulfur content in petroleum fluids. Furthermore, any mercaptans (RSH), carbonyl sulfide (COS), and carbon disulfide (CS2), not absorbed with from the sour gas through amine purification units, complicate the process scheme for downstream liquid treatment.

In this work case studies have been carried out on Aspen HYSYS V8.8 for the simultaneous removal of H2S and organic sulfur species for natural gas. Solvent concentration in the aqueous solution has been varied from 0-60 % by volume for simultaneous removal of H2S, Methyl mercaptan, Ethyl mercaptan and n-Propyl mercaptan. While using DEA as the solvent the simulation results show an increase of 14 % Ethyl mercaptan, 49 % Methyl mercaptan and 111 % CO2 removal while a decrease of 41.82 % and 40.66 % was observed in H2S and n-Propyl mercaptan removal respectively vis a vis MDEA.

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