

The Summer Undergraduate Research Fellowship (SURF) Symposium
2 August 2018
Purdue University, West Lafayette, Indiana, USA

Modular Scale Process for Sour Gas Removal and Disposal

Audra R. Barnes¹, Zewei Chen², and Rakesh Agrawal²

¹Department of Chemical Engineering, Florida A&M University

²School of Chemical Engineering, Purdue University

ABSTRACT

The purpose of this research is to find methods for removing sour gas, H₂S and CO₂, from shale gas streams and properly dispose of them for small scale gas processing plants. H₂S and CO₂ are both contaminants found in shale gas, and they must be removed in order for the natural gas to meet environmental and gas pipeline regulations. Currently, at regional scale plants, the amine sweetening process followed by the Claus process are used to remove and treat the sour gas, however these do not work for small scale plants. Three alternative methods were explored to accommodate small scale gas processing plants, in order to retrieve the shale gas in remote areas. The first method is the membrane separation process, which uses membranes to separate sour gas from natural gas. The second method is adsorption, which uses amine sorbents to adhere to the sour gas molecules. The third method is the hybrid method, which combines both the membrane separation process and amine sweetening process. Zinc oxide may be able to serve as an alternative to the Claus process for small scale gas processing plants.

KEYWORDS

Sour gas, Amine sweetening, Membranes, Adsorption, Hydrogen Sulfide, Carbon Dioxide