



TR0700320

13<sup>th</sup> International Conference on Emerging Nuclear Energy Systems June 03-08, 2007, İstanbul, Türkiye

## A NOVEL CO<sub>2</sub> SEQUESTRATION SYSTEM FOR ENVIRONMENTALLY PRODUCING HYDROGEN FROM FOSSIL-FUELS

**William Eucker IV**

United States Naval Academy, Annapolis, Maryland, USA

E-mail: *william.eucker@gmail.com*

### ABSTRACT

Aqueous monoethanolamine (MEA) scrubbers are currently used to capture carbon dioxide (CO<sub>2</sub>) from industrial flue gases in various fossil-fuel based energy production systems. MEA is a highly volatile, corrosive, physiologically toxic, and foul-smelling chemical that requires replacement after 1000 operational hours. Room temperature ionic liquids (RTILs), a novel class of materials with negligible vapor pressures and potentiality as benign solvents, may be the ideal replacement for MEA. *Ab initio* computational modeling was used to investigate the molecular interactions of ILs with CO<sub>2</sub>. The energetic and thermodynamic parameters of the RTILs as CO<sub>2</sub> solvents are on par with MEA. As viable competitors to the present CO<sub>2</sub> separation technology, RTILs may economize the fossil-fuel decarbonization process with the ultimate aim of realizing a green hydrogen economy.

**Acknowledgement:** The Office of Naval Research-Global (London) and the Chalmers University of Technology, Göteborg, Sweden, supported this research.