

Carbon Dioxide Capture using Crude Glycerol Based Deep Eutectic Solvent

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Abstract—Biodiesel produced by transesterification of oil with methanol yields about 8-11% glycerol as a by-product. A cost efficient and eco-friendly method has been researched to convert the by-product glycerol into a deep eutectic solvent (DES). This DES has been used to study the absorption of CO₂ via carbamate formation upon reaction between their hydrogen bonding donor units and CO₂. DES made of crude glycerol – choline chloride exhibits a low gravimetric uptake of 0.377 wt% with initial kinetics (0.123 wt% uptake within 20min). The given DES also shows sustainable performance in the presence of water, decent tolerance against temperature rise, and relatively low heat of absorption attractive for regeneration processes. The observed capture of CO₂ using DES suggests that crude glycerol is candidates to replace hydrogen bond donor (HBD) in conventional DES system. Crude glycerol based DES CO₂ absorption technology is worth to further explore.

Keywords: Deep eutectic solvent; CO₂ absorption; crude glycerol; optimization.