

In-situ Oxygen Enrichment for Underground Coal Gasification

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Abstract : Membrane separation technology is still considered as an emerging technology in the mining sector and does not yet have the widespread acceptance that it has in other industrial sectors. Underground Coal Gasification (UCG), wherein coal is converted to gas in-situ, is a safer alternative to mining method that retains all pollutants underground making the process environmentally friendly. In-situ combustion of coal for power generation allows access to more of the physical global coal resource than would be included in current economically recoverable reserve estimates. Where mining is no longer taking place, for economic or geological reasons, controlled gasification permits exploitation of the deposit (again a reaction of coal to form a synthesis gas) of coal seams in situ. The oxygen supply stage is one of the most expensive parts of any gasification project but the use of membranes is a potentially attractive approach for producing oxygen-enriched air. In this study, a variety of cost-effective membrane materials that gives an optimal amount of oxygen concentrations in the range of interest was designed and tested at diverse operating conditions. Oxygen-enriched atmosphere improves the combustion temperature but a decline is observed if oxygen concentration exceeds optimum. Experimental result also reveals the preparatory method, apparatus and performance of the fabricated membrane.

Keywords : membranes, oxygen-enrichment, gasification, coal

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