

## Experimental Study on Syngas Production by Tri-reforming of Methane(TRM)

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Tri-reforming of methane in order to control the syngas ratio ( $H_2/CO$ ) is investigated in the direct DME synthesis process. Technology from the present project, process for preparing DME from  $CO_2$  and Methane, is a single-step process or "direct methodology" for directly synthesizing DME from the synthetic gas by tri-reforming reaction of methane. This process is more economical than the existing two-step process also called "indirect methodology" which prepares Methanol from the synthetic gas and dehydrating two molecules of Methanol. KOGAS intends to establish the unique domestic model incorporating the single-step process for producing DME.

This process has the advantage that  $CO_2$  in natural gas fields can be harnessed. The ratio of synthetic gas can be controlled to the desirable syngas ratio of 1:1.  $CO_2$  generated from synthesizing DME is recovered by the tri-reforming reaction which is then utilized as raw material for preparing synthetic gas. The un-reacted synthetic gas is recovered by the DME Reactor and utilized as part of the process for preparing DME.