



## Experimental investigation of gas consumption for simple gas hydrate formation in a recirculation flow mini-loop apparatus in the presence of modified starch as a kinetic inhibitor

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### Abstract

The main objective of the present work is to investigate experimentally of simple gas hydrate formation with or without the presence of kinetic inhibitors such as modified starch in a recirculation flow mini-loop apparatus. For this purpose, a laboratory recirculation flow mini-loop apparatus was set up to measure the induction time for hydrate formation and gas consumption rate when a hydrate forming substance (such as  $C_1$ ,  $C_3$ ,  $CO_2$  and  $i-C_4$ ) is contacted with water in the absence or presence of dissolved inhibitor under suitable temperature and pressure conditions. In each experiment, a water blend saturated with pure gas is circulated up to a required pressure. Pressure is maintained at a constant value during experimental runs by means of the required gas make-up. The effect of pressure on gas consumption during hydrate formation is investigated with or without the presence of poly vinylpyrrolidone (PVP) and modified starch as kinetic inhibitors at various concentrations. Our results were shown that the modified starch can be applied as inhibitors in prevention of simple gas hydrate formation in mini-loop apparatus.

**Keywords:** simple gas, kinetic inhibitor, modified starch, gas consumption, mini-loop

### Research Highlights

- Measuring the induction time and gas consumption for simple hydrate forming substance such as  $C_1$ ,  $C_3$ ,  $CO_2$  and  $i-C_4$
- Using modified starch as KHI (new KHI)
- Experimental investigation is in recirculating flow mini-loop apparatus