

**Preparation of $-\text{SO}_3^-$ -coated nano-promoters for methane hydrate formation:
effects of the existence pattern of $-\text{SO}_3^-$ groups on the promotion efficiency**

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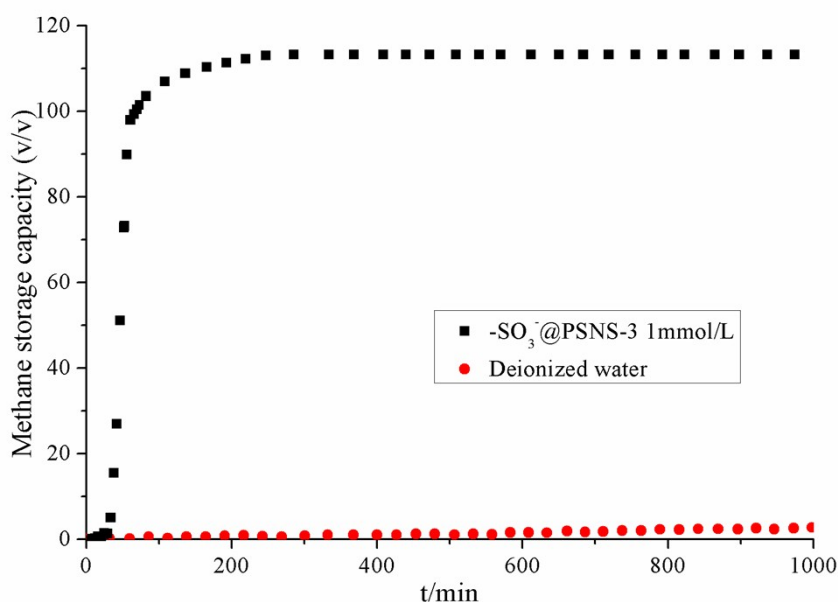


Fig. S1 Methane hydrate formation rate with $-\text{SO}_3^-$ @PSNS-3 of 1 mmol/L and deionized water at static condition (the initial conditions were 6 MPa and 275.15 K)