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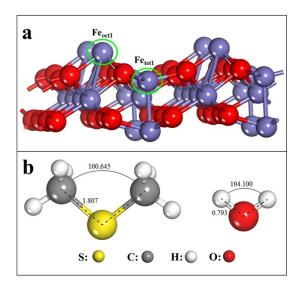


Figure S1 Structure of optimized Fe_3O_4 unit cell, dimethyl sulfide and water molecule models Figure S2

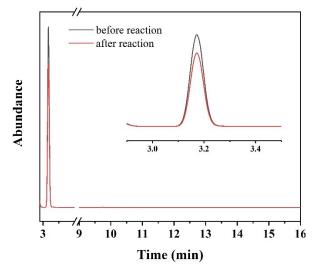
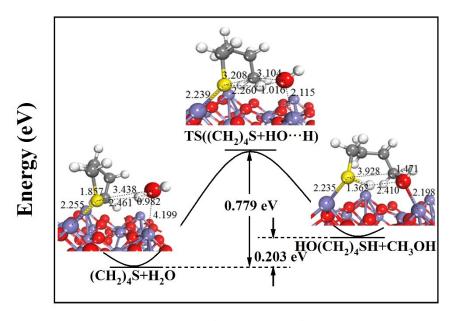


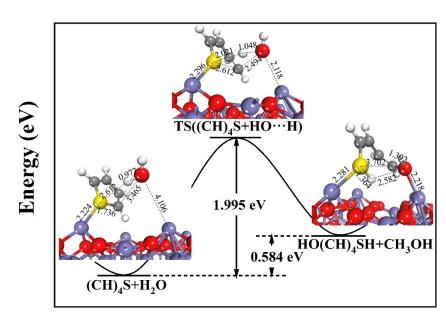
Figure S2 GC-MS spectra of reaction system before and after catalytic reaction; inset shows the amplification of $C_2H_6SC_2H_6$ species.

Figure S3



Reaction coordinate

Figure S3 The structure and energy variety of optimized Fe₃O₄ (111) and C₄H₈S during catalytic reaction with assistance of free H₂O molecule



Reaction coordinate

Figure S4 The structure and energy variety of optimized Fe₃O₄ (111) and C₄H₄S during catalytic reaction with assistance of free H₂O molecule

Figure S5

Figure S4

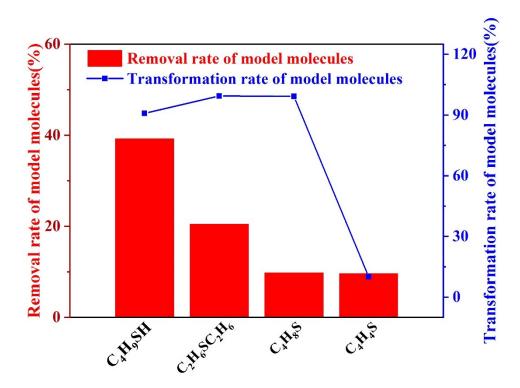


Figure S5 Removal rate and transformation rate of C₄H₉SH, C₂H₆SC₂H₆, C₄H₈S, C₄H₄S under equal reaction condition (30% H₂O, 200°C/12 h)