

Supporting Information

The Role of Manganese Oxidations States in SF₆ Degradation Performance of SiC-

Supported Composites

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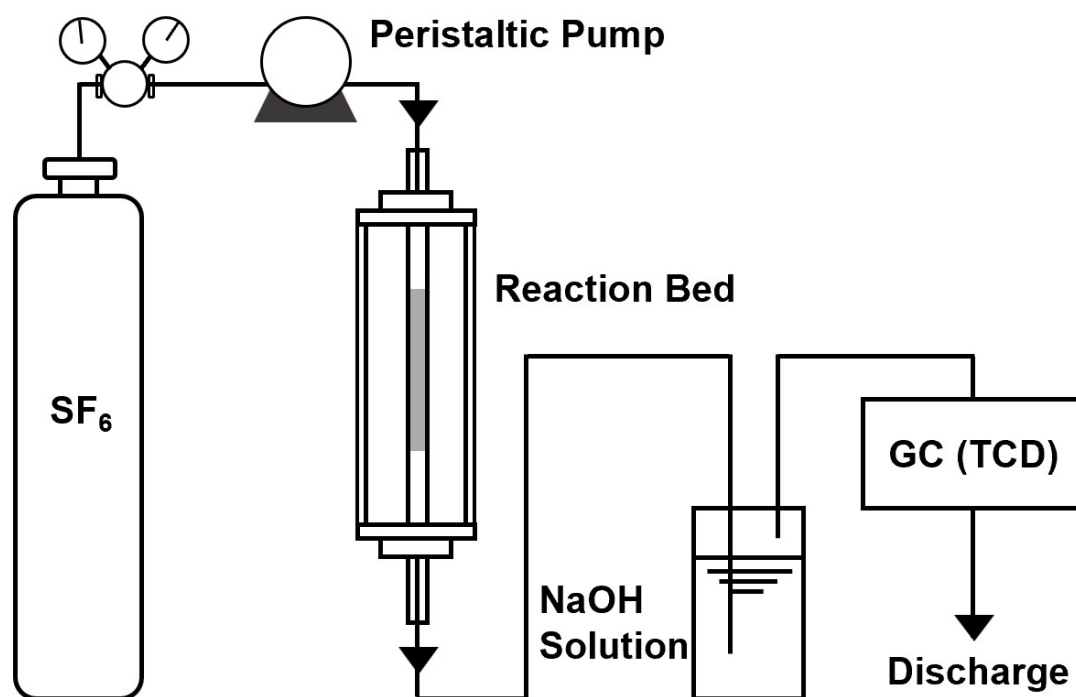


Fig.S1 Schematic diagram of high-temperature reaction device

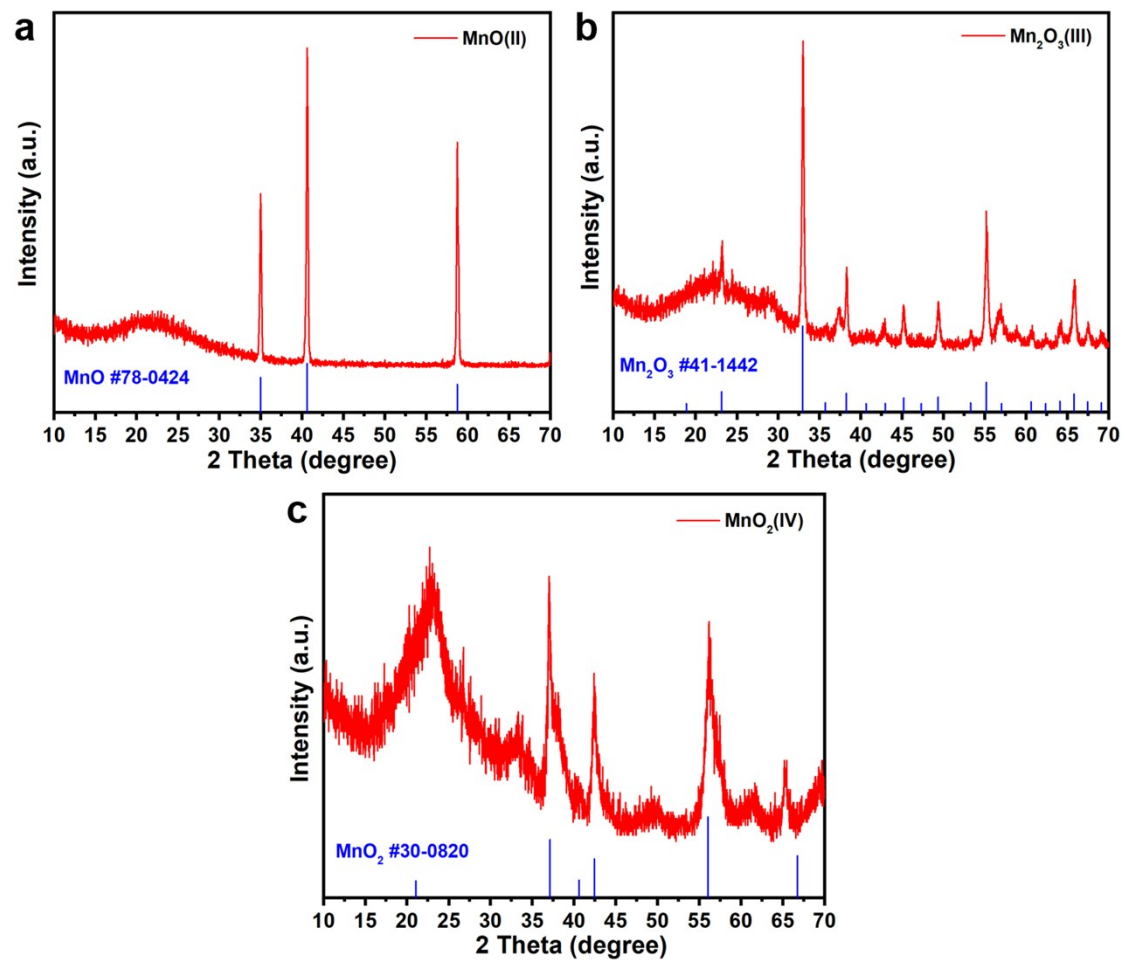


Fig.S2 XRD patterns of (a) MnO, (b) Mn₂O₃, (c) MnO

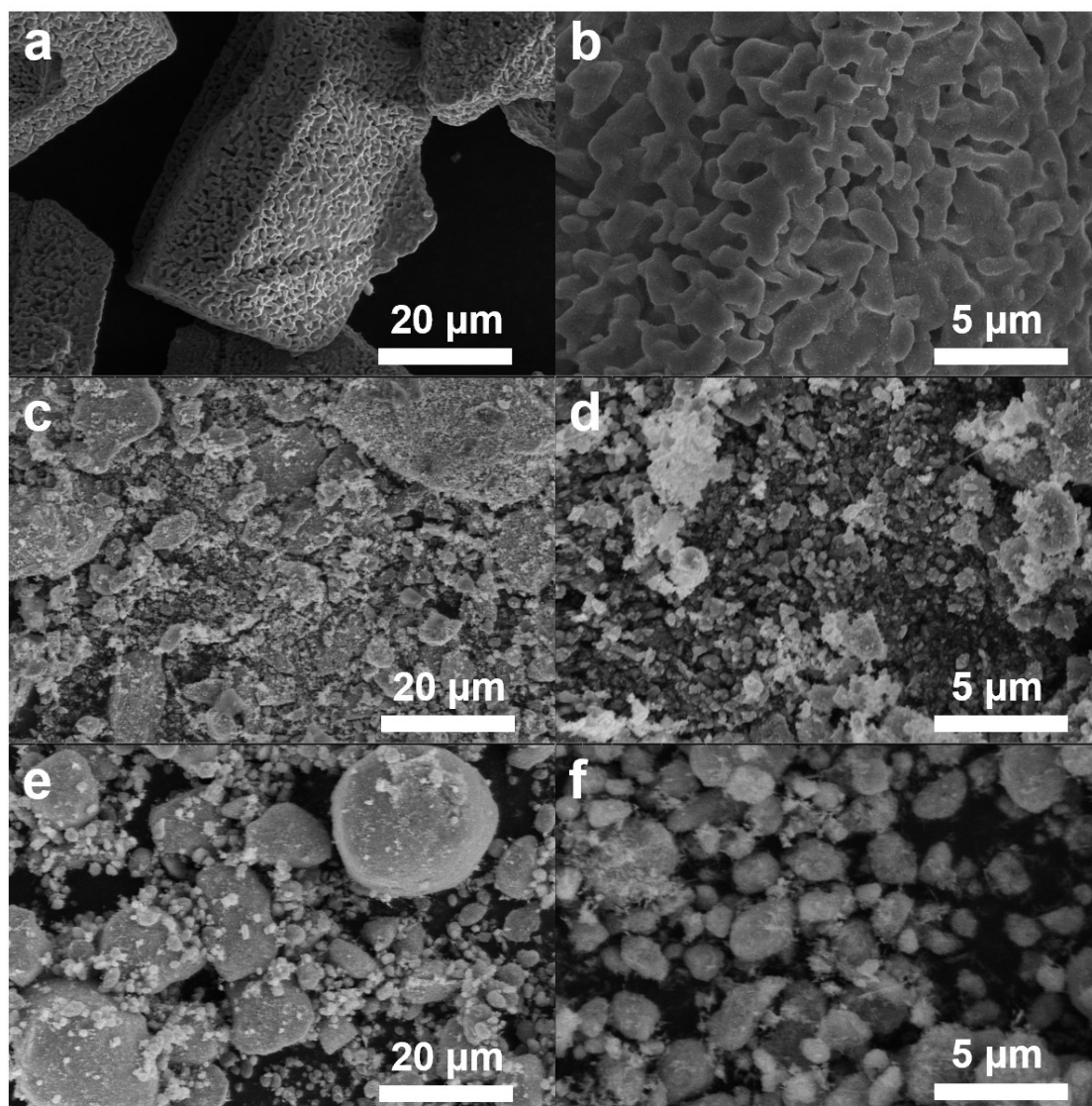


Fig.S3 SEM images of (a-b) MnO, (c-d) Mn₂O₃, (e-f) MnO₂

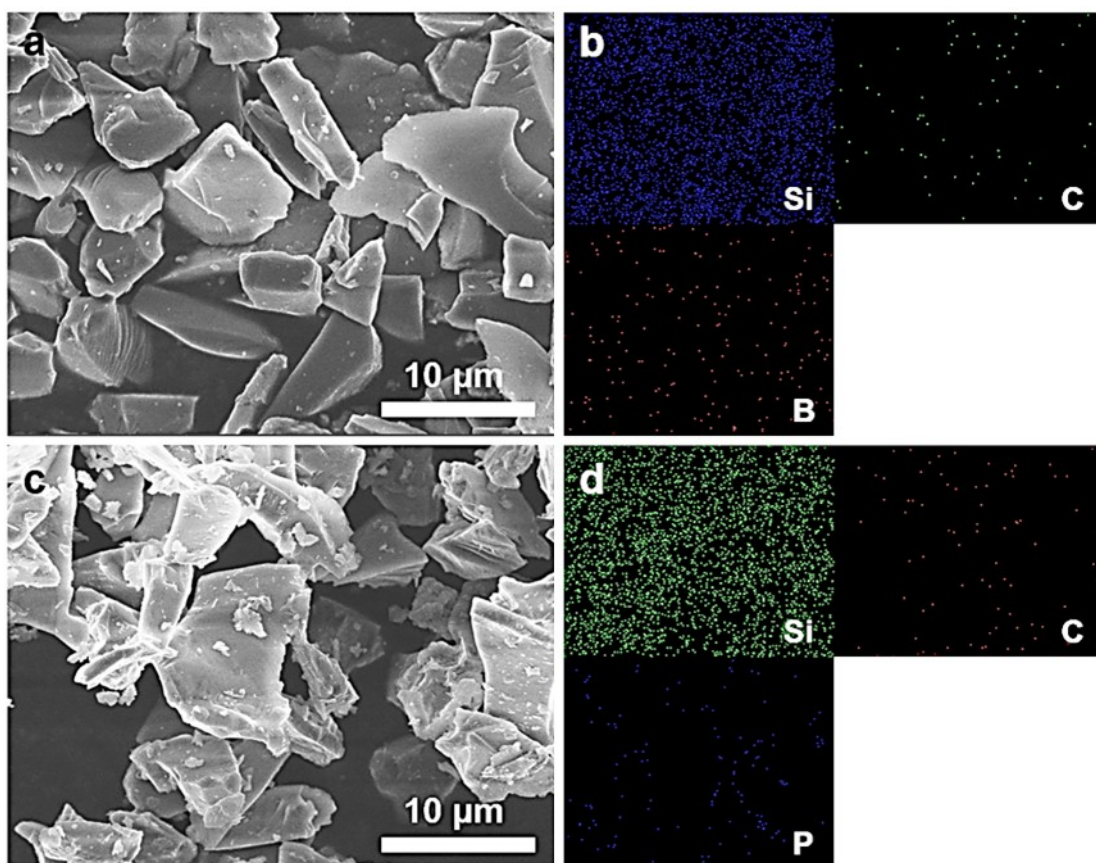


Fig.S4 (a-b) SEM and EDX images of B-doped SiC-Mn composites; (c-d) SEM and EDX images of P-doped SiC-Mn composites

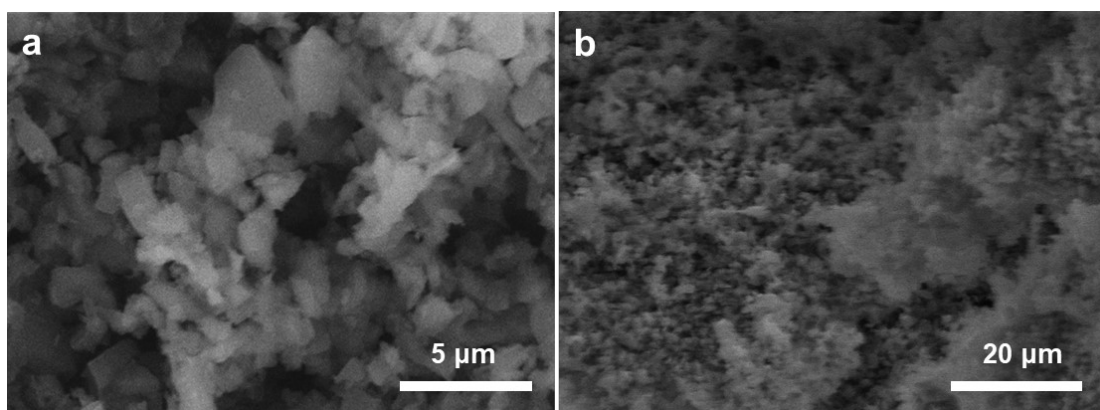


Fig.S5 SEM of SiC-Mn(0) composites before and after reaction

Table S1. Comparison of SF₆ Degradation Capacities of Various Catalysts at Different Temperatures

Sample	Reaction temperature	Atmosphere	Degradation amount	Reference
SSS	500°C	N ₂	1.52 mL g ⁻¹	1
SSS	600°C	N ₂	3.22 mL g ⁻¹	
SSS	700°C	N ₂	3.86 mL g ⁻¹	
Sludge (0.5 g)	500°C	N ₂	8.74 mL g ⁻¹	2
Sludge (0.5 g)	600°C	N ₂	21.73 mL g ⁻¹	
Sludge (2.5 g)	600°C	N ₂	24.64 mL g ⁻¹	
SiC/FeOOH	600°C	Air	54.7 mL g ⁻¹	3
SiC/FeOOH	700°C	Air	99.0 mL g ⁻¹	
SiC/Mn	600°C	Air	62.27 mL g ⁻¹	
SiC/MnO	600°C	Air	39.87 mL g ⁻¹	This work
SiC/Mn ₂ O ₃	600°C	Air	14.99 mL g ⁻¹	
SiC/Mn ₃ O ₄	600°C	Air	3.05 mL g ⁻¹	

Table S2. Degradation Performance of Different Mn-Containing Composites at 600°C

Composite	Mean Degradation	Degradation	Standard Deviation
	Rate (%)	Capacity (mL/g)	(%)
SiC-Mn(0)	96.97	62.27	±1.85
SiC-MnO(II)	93.27	38.92	±2.23
SiC-Mn ₂ O ₃ (III)	40.82	17.36	±2.22
SiC-MnO ₂ (IV)	14.62	4.76	±0.62

Reference

- 1 J. Zhang, J. Z. Zhou, Z. P. Xu, Y. Li, T. Cao, J. Zhao, X. Ruan, Q. Liu and G. Qian, *Environ. Sci. Technol.*, 2014, **48**, 599–606.
- 2 J. Zhang, J. Z. Zhou, Q. Liu, G. Qian and Z. P. Xu, *Environ. Sci. Technol.*, 2013, **47**, 6493–6499.
- 3 X. Meng, J. Hu, B. Dong, Y. Zhu, Y. Zhang, J. Zai and X. Qian, *Chem. Eng. J.*, 2022, **450**, 137949.