

Size- dependent electromagnetic wave absorption of 3C-SiC particles

Hairui Zhao^a, Jingxiang Liu^a, Wentao Liu^b, Zongyi Shao^b, Zhijiang Wang^{a,c,*}

Materials

The synthesis process of SiC₀₆ is provided in our previously published work (J. Phys. Chem. C, 2018, 122, 18537–18544; Carbon, 2023, 213, 118253; Carbon, 2024, 218, 118727). The powder synthesis employs a modified carbothermal reduction reaction. First, carbon nanoparticles, silicon powder, and silicon dioxide powder are mixed in a 4:1:1 molar ratio and heated to 1500°C under an argon atmosphere, holding for 2 hours. After cooling to room temperature, the obtained powder is treated at 700°C in an air environment for 2 hours to remove any unreacted carbon nanoparticles, ultimately yielding the nanoparticle powder. The primary reaction that occurs during this process are:

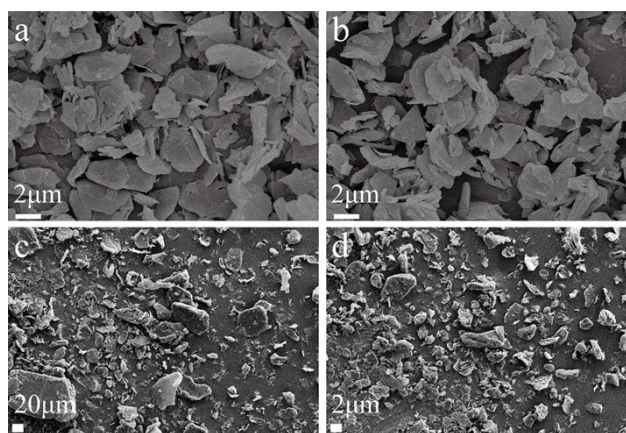
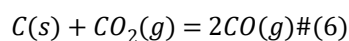
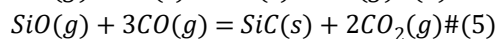
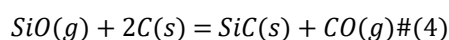
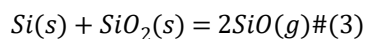
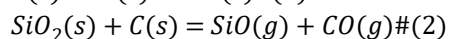
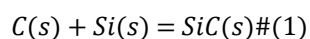


Fig. S 1 SEM of graphite powder. (a), (b): 1.6 μm; (c), (d): 36 μm.

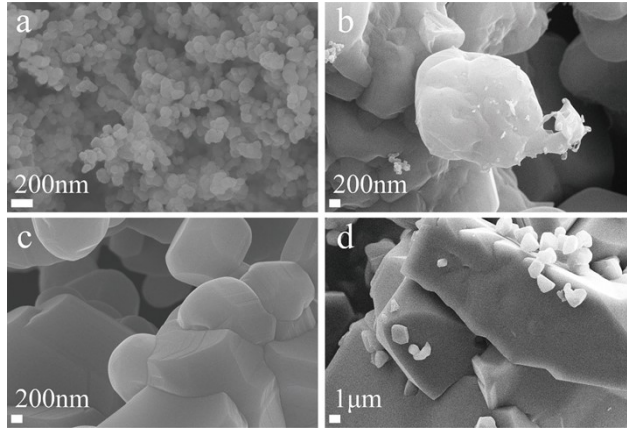


Fig. S 2 SEM images of samples. (a) SiC_{06} , (b) SiC_1 , (c) SiC_3 , and (d) SiC_5 .

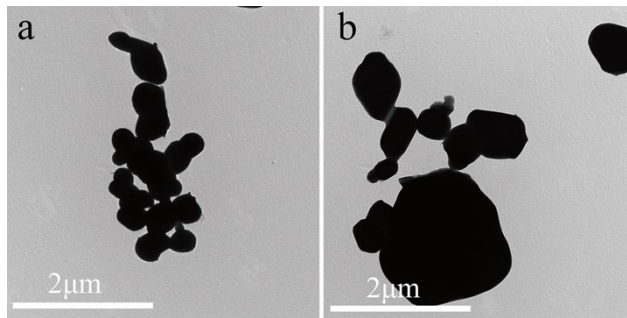


Fig. S 3 TEM images. (a) SiC_3 , (b) SiC_5 .

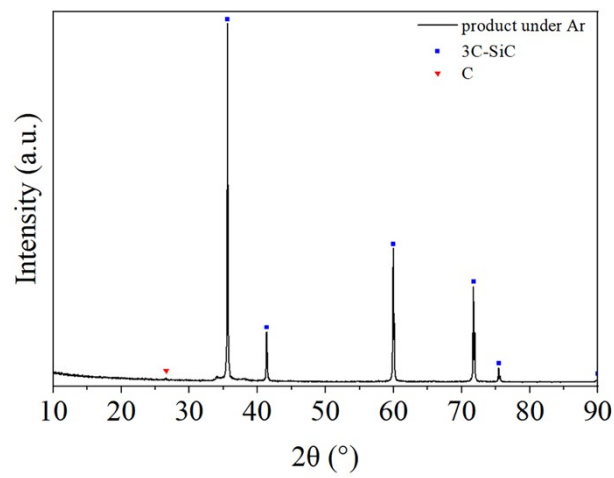


Fig. S 4 XRD of products obtained under Ar

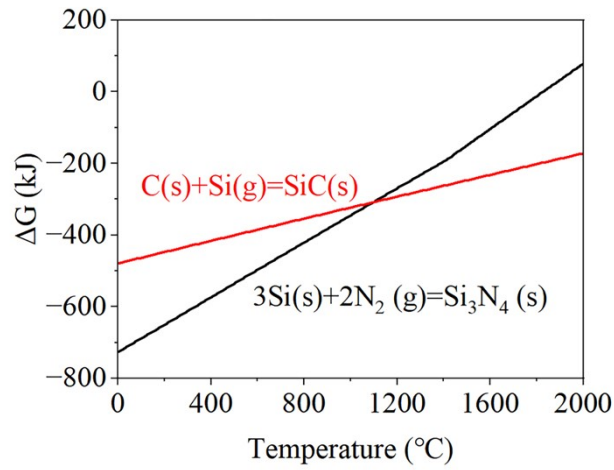


Fig. S 5 Thermodynamic calculation of reaction

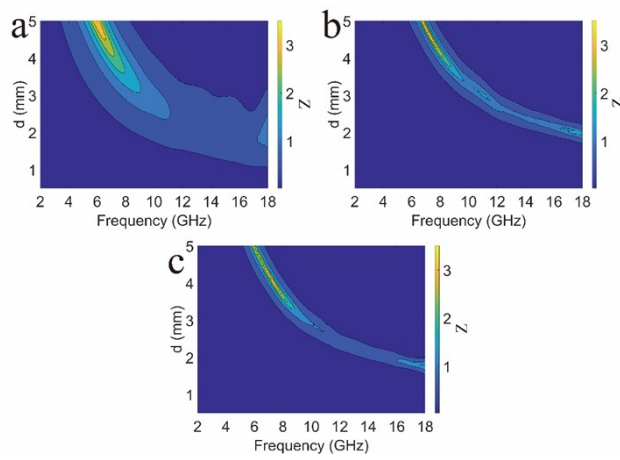


Fig. S 6 Impedance matching of (a) SiC_1 , (b) SiC_3 and (c) SiC_5 .