

Supplementary Information

α -Si₃N₄ dendrites and whiskers fabricated using electron irradiation technology

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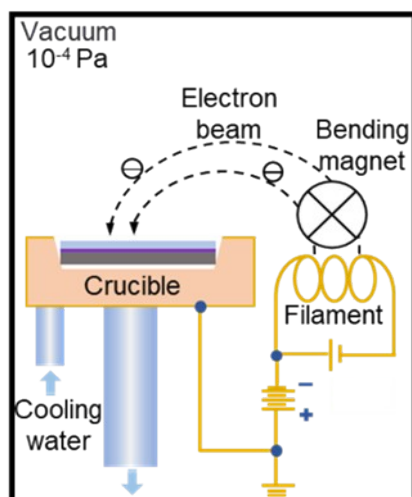


Figure S1. The schematic diagram illustrating the fabrication of α -Si₃N₄ by electron beam irradiation. Electrons are emitted by the tungsten filament using a high current. A permanent magnet is used to focus the electrons and direct them to the aBN/SiO₂/Si wafer. The energy of the electron beam can be controlled. A two-axis electron beam deflection system is employed accurately locate the electron beam on the sample. After irradiation for 2 min, the sample is cooled down to room temperature with circulating cooling water.

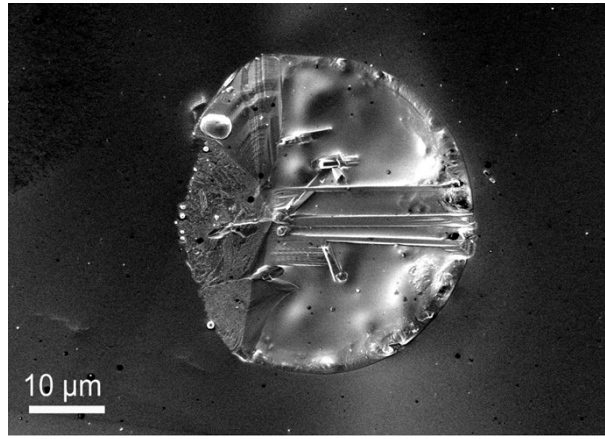


Figure S2. SEM image showing the morphology of the irradiation region with α -Si₃N₄ whiskers. The electron beam energy is 75 keV.

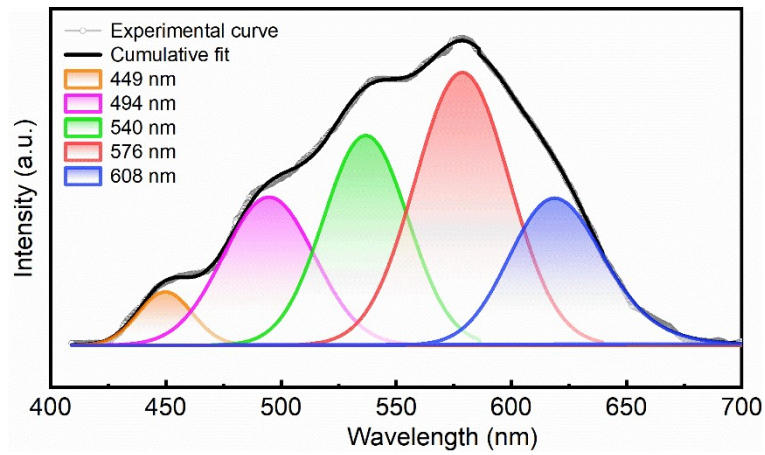


Figure S3. Photoluminescence properties of tree-like α -Si₃N₄ dendrites. The intrinsic emission spectrum of tree-like α -Si₃N₄ dendrites is labelled by grey line, and the black one represents corresponding fitted line using the Gaussian-Lorentzian method. Gaussian components of the experimental peak decomposition are depicted in color peaks. The PL spectrum has a broad strong emission at 576 nm, corresponding to the photon energy of 2.2 eV. In addition, emissions at 449 nm (2.76 eV), 494 nm (2.51 eV), 540 nm (2.30 eV) and 608 nm (2.04 eV) are also observed in the PL spectrum.