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ARTICLE

**Supplementary Information**

**Gamma-ray Irradiation Induced Oxidation and Disproportionation at the amorphous $SiO_2$/Si Interfaces**

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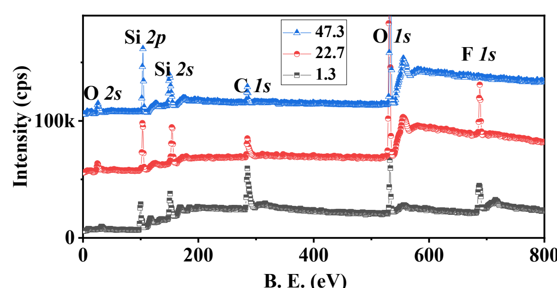


Figure S1. XPS survey results of three typical films with all the elements marked.

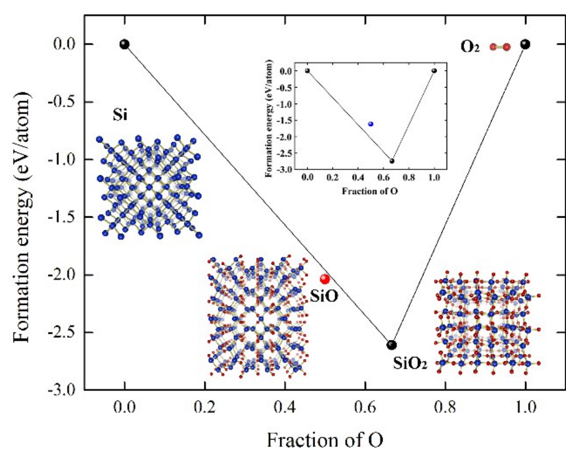


Figure S2. The phase diagram of Si-O calculated with ReaxFF. The formation energy of SiO is below the Si-$SiO_2$ line, which means the ReaxFF erroneously finds SiO being thermally stable and disallowing disproportionation energetically. For comparison, top inset depicts phase diagram calculated using DFT with the HSE functional. The formation energy of SiO is above the Si-$SiO_2$ line, showing that SiO is unstable and can decompose into $SiO_2$ and Si phases.

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