

Ultrahigh Temperature Flash Sintering of Binder-Less Tungsten Carbide within 6s

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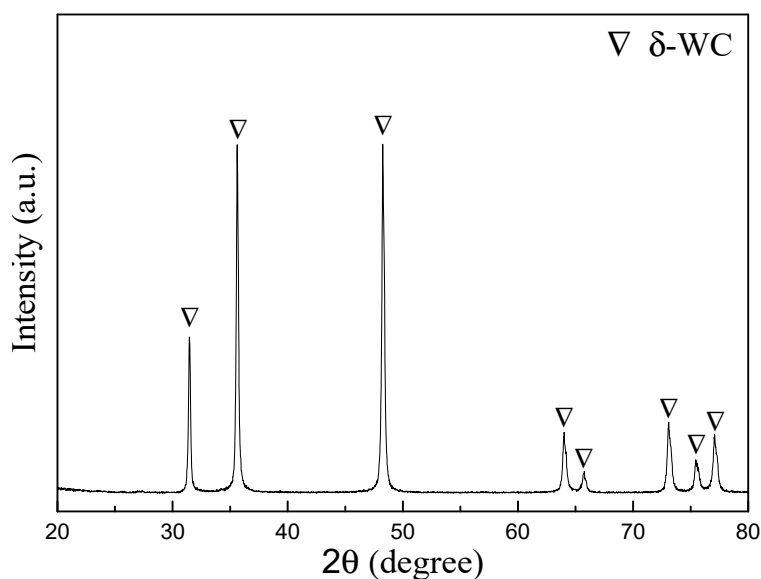


Figure S1. X-Ray Diffraction (XRD) pattern of the starting powder.

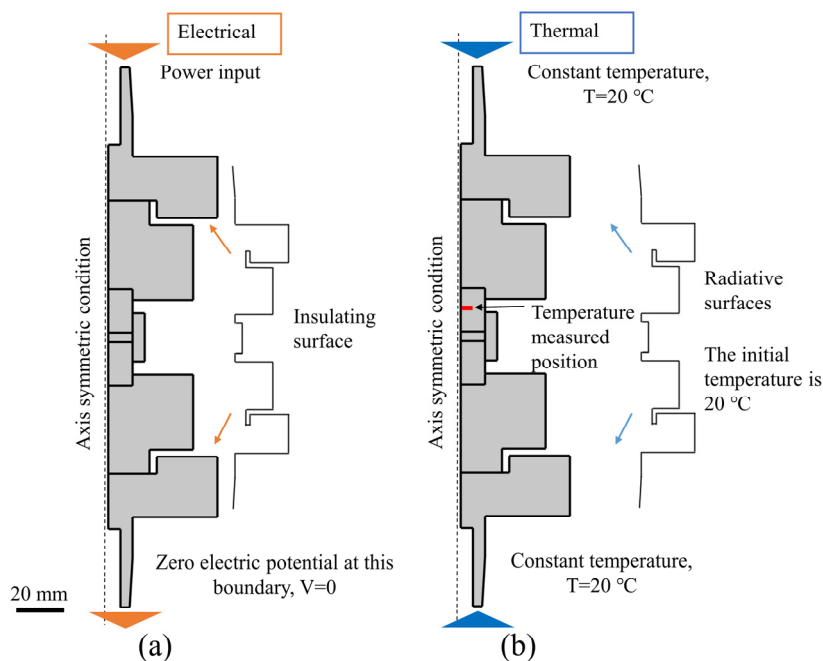


Figure S2. Assumed FEM model's boundary conditions for (a) electric and (b) thermal fields.

WC is a material “hard to densify”. Tungsten carbide based ceramics are typically sintered in liquid phase (WC-Co or other binders) [1,2], where the metallic phase facilitates consolidation via liquid phase sintering and enhances the fracture toughness. Initial test were done using alumina dies as done in the previous investigation on capacitor discharge sintering [3,4] and Electric Resistance Sintering [5,6]. Unfortunately, due to the heat concentration, copper alloy punch was molten and heavily damaged as shown in Figure 1a.

References

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