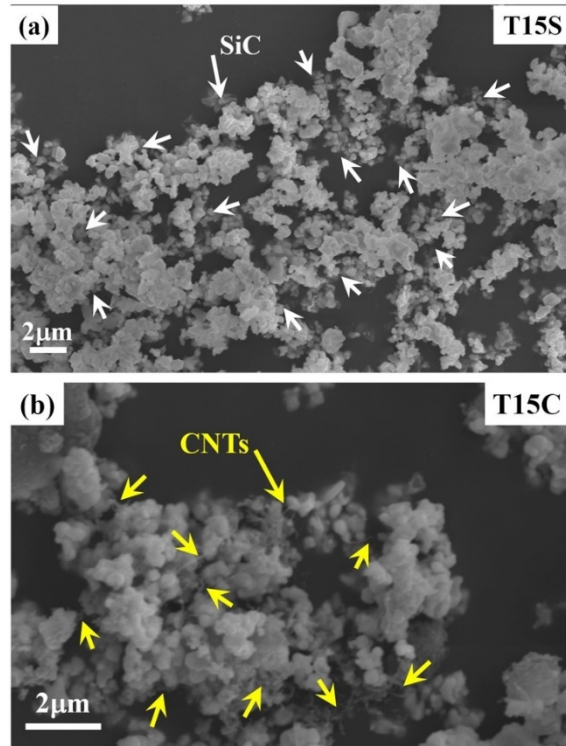
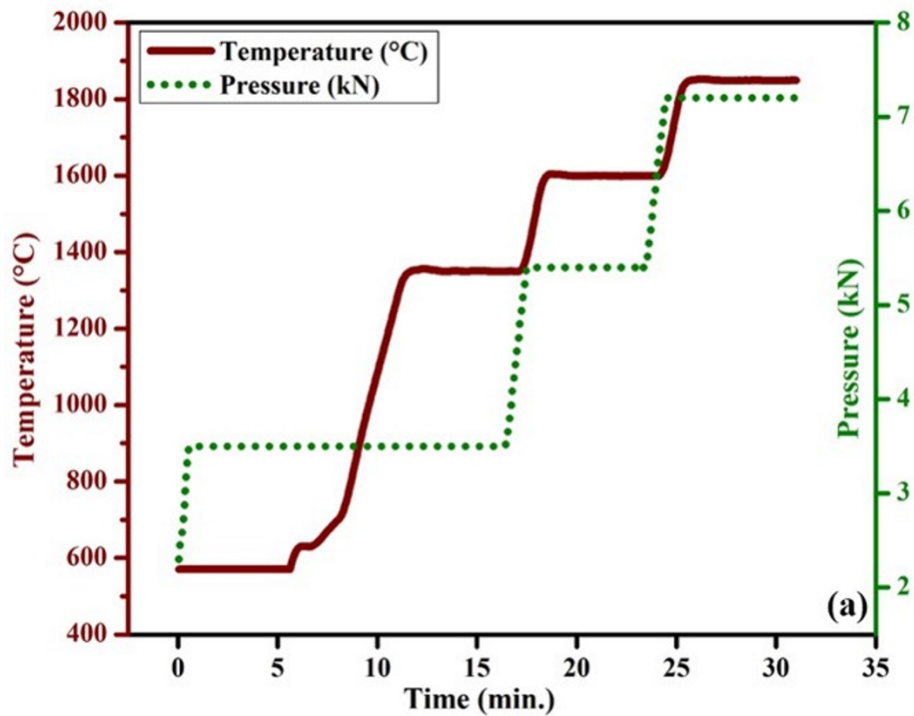


Supplementary Information

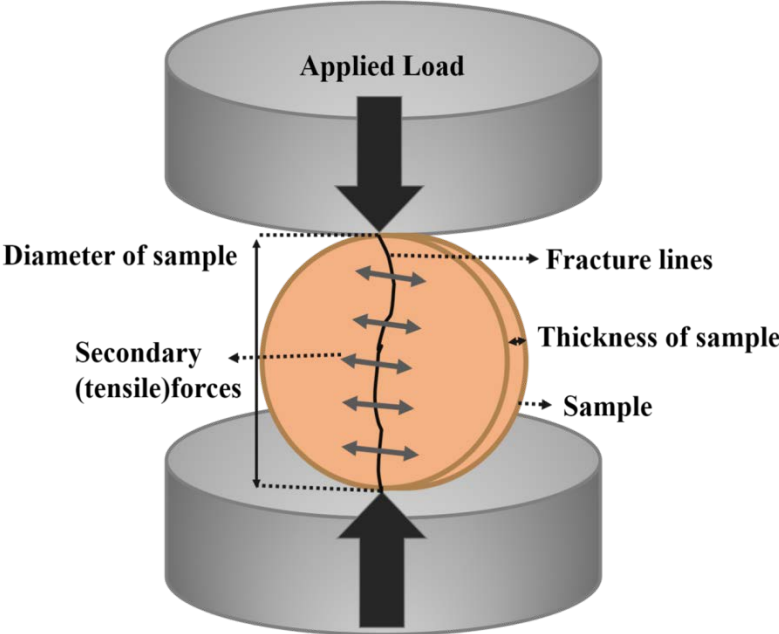
S1: SEM micrographs of the starting TaC based composite powders (a) T15S and (b) T15C.



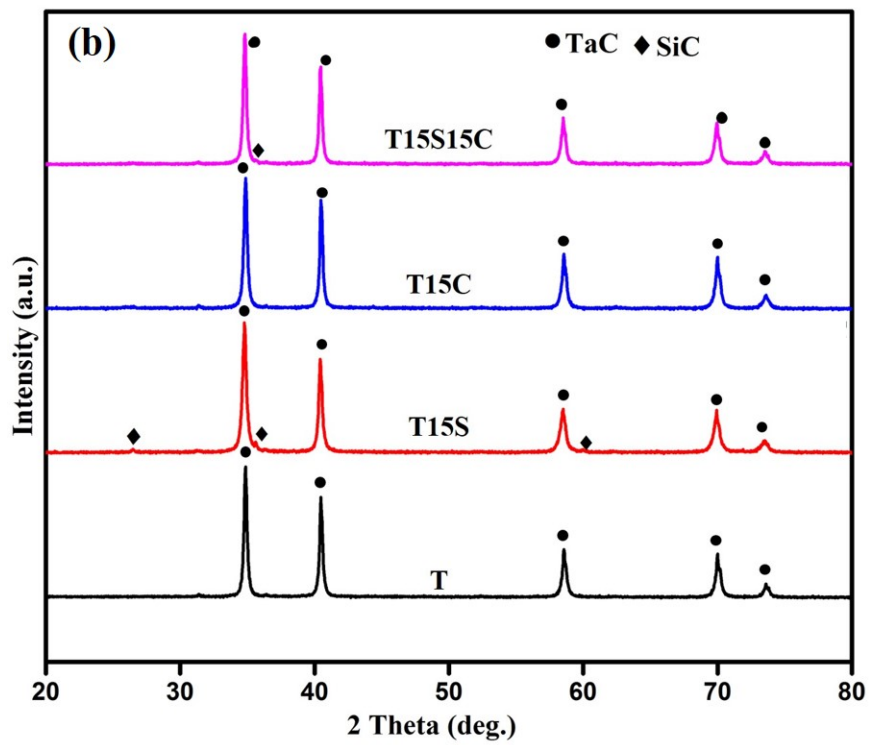
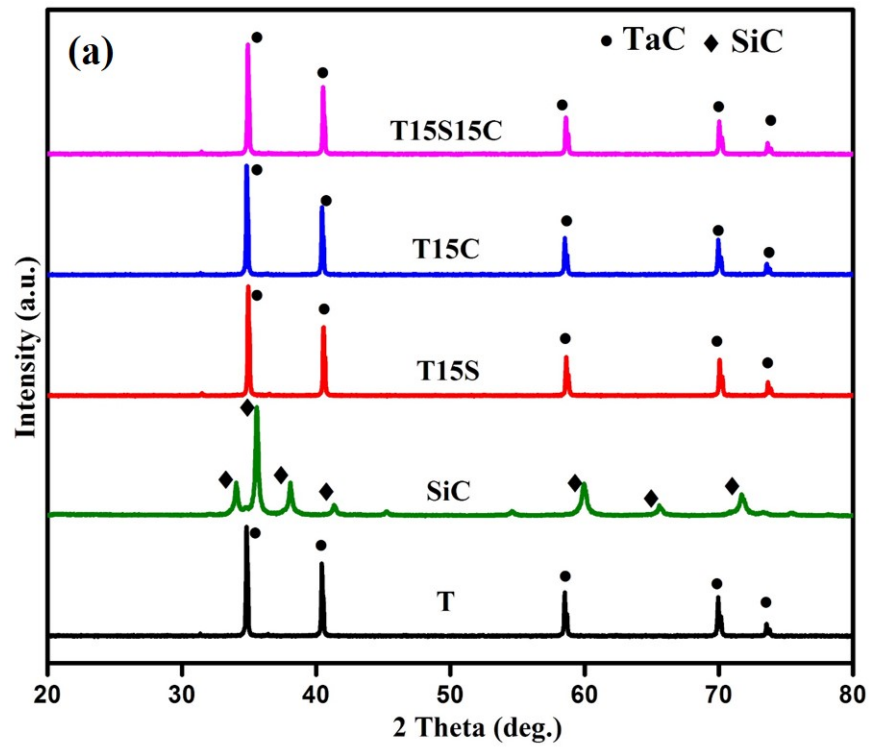
S2: Temperature and pressure processing profile during multi-stage SPS processing of TaC based composites.



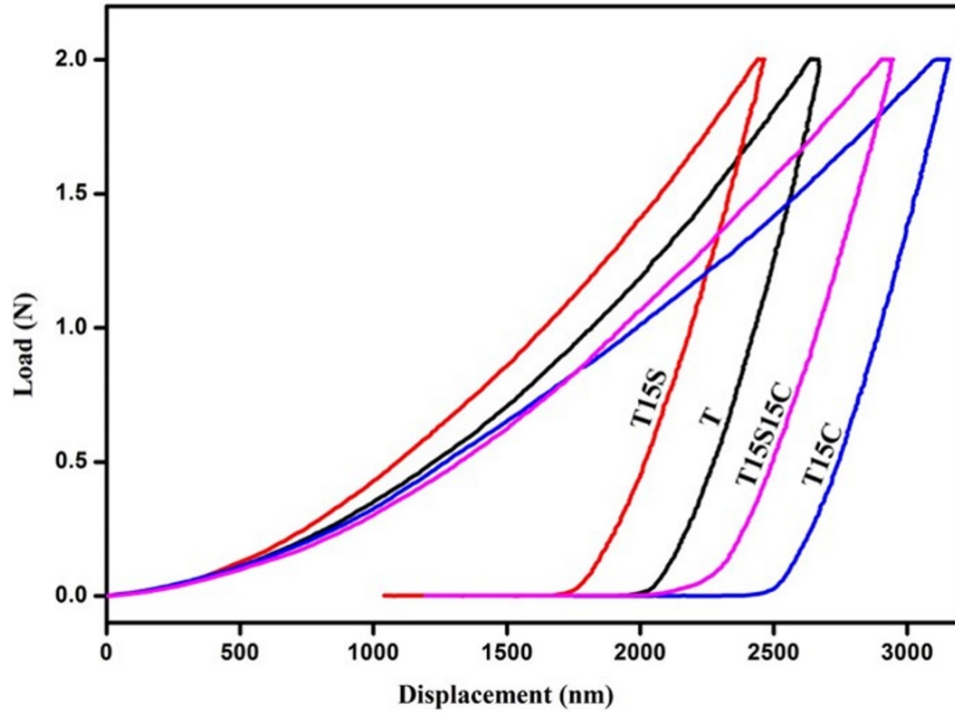
S3: Schematic of diametrical compression setup.



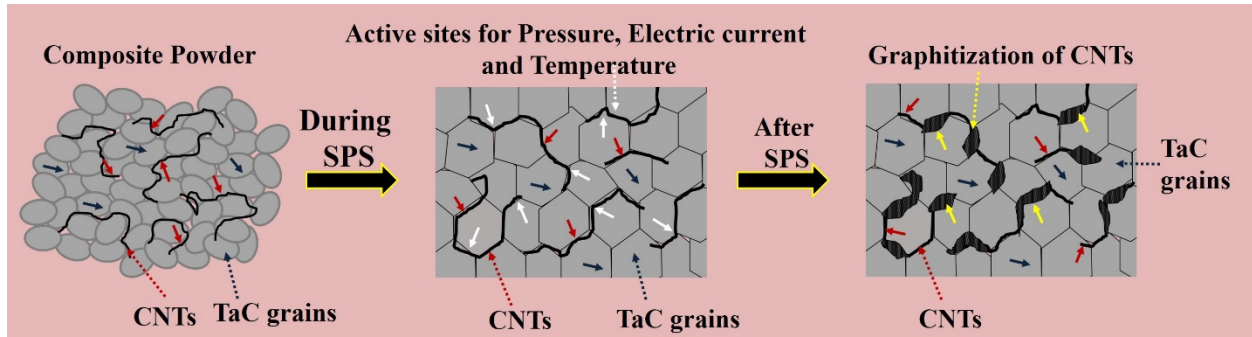
S4: XRD pattern of (a) starting powder composites and (b) spark plasma sintered TaC based composites.



S5: Instrumented indentation curves for spark plasma sintered TaC based composites.



S6: Schematic illustrating transformation of CNTs to graphitic flakes during SPS processing.



S7: Load versus displacement curves showing the displacement and maximum load before fracture for spark plasma sintered TaC based composites. The crack initiation (shown with an arrow head) shifts towards higher load in case T15C and T15S15C, which indicates higher load bearing via pull-out mechanism. However, no such crack formation till the fracture was observed in T15S composite.

