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| **Abstract:** |  |
| Spark plasma sintering (SPS) is a powerful technique for consolidating metal and ceramic powders. The key benefits of SPS include rapid sintering capability, achievement of full density at a considerably low temperature and an excellent control over the grain sizes. Such technique can be used to clad dissimilar ceramic and steel materials. In this study, a laminated composite material of nanocrystalline WC-10Co and AISI4340 is fabricated using SPS, which has notbeen reported so far. The sintering behaviour of 100 nm particle size cemented carbides is analysed, and their bonding characteristics with steel are examined at the temperatures ranging from 1000 to 1150 °C, sintered for 5 min, under 80 MPa of constant pressure. The microstructure of the bonding interface is investigated, and the mechanical properties of the bond are evaluated. The phases formed at the interface are identified and their formation mechanisms are discussed. A novel miniature tensile test system is adopted to determine the tensile strength of the bond, and the fracture characteristics of the bonding interface is illustrated microscopically. It is expected that this research can provide a valuable reference for joining ceramic and steel materials to manufacture dissimilar laminated composite materials using SPS technique. | |