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| **Title:** | Effects of holding time on the sintering of cemented tungsten carbide powder and bonding with high strength steel wire | | |
| **Author(s) Name:** | Mahadi Hasan, Jingwei Zhao, Zhenyi Huang, Hui Wu, Fanghui Jia, Zhengyi Jiang | | |
| **Contact Email(s):** | mahadi@aiub.edu | | |
| **Published Journal Name:** | Journal of Materials Engineering and Performance | | |
| **Type of Publication:** | Journal | | |
| **Volume:** | 28 | Issue | 1 |
| **Publisher:** | Springer Link | | |
| **Publication Date:** | Jul 15, 2019 | | |
| **ISSN:** | 15441024 | | |
| **DOI:** | 10.1007/s11665-019-04153-5 | | |
| **URL:** | https://link.springer.com/article/10.1007/s11665-019-04153-5 | | |
| **Other Related Info.:** | Page 4074-4085 | | |
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| **Abstract:** |  |
| Cemented tungsten carbide (WC-10Co) and high-strength (AISI 4340) steel were successfully bonded by hot compaction diffusion bonding at a low temperature. The effects of holding time (5-50 min) on microstructure and mechanical properties of the sintered carbides and bonding strengths of the dissimilar bilayered composite materials were examined. The results show that the mechanical properties of the carbides increase, but the bonding strength increases firstly and then decreases with the increase in holding time. The maximum density and hardness achieved are 95.92 and 99.5%, respectively. A transitional layer forms at the interface as a result of elemental interdiffusion. The depth of the layer increases with the increase in holding time. The optimal bonding time is determined to be 40 min at a temperature of 1200C and a pressure 160 MPa, by which the maximum bonding strength of 204 MPa of the WC-10Co/4340 steeljoints can be achieved. | |