

Accepted Manuscript

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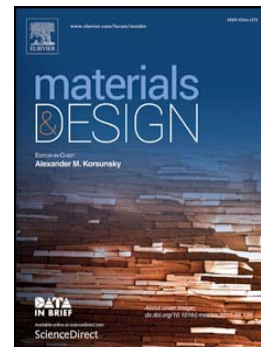
PII: S0264-1275(16)31036-X
DOI: doi: [10.1016/j.matdes.2016.07.129](https://doi.org/10.1016/j.matdes.2016.07.129)
Reference: JMADE 2133

To appear in:

Received date: 20 May 2016
Revised date: 18 July 2016
Accepted date: 28 July 2016

Please cite this article as: G.C. Yao, Q.S. Mei, J.Y. Li, C.L. Li, Y. Ma, F. Chen, M. Liu, Cu/C composites with a good combination of hardness and electrical conductivity fabricated from Cu and graphite by accumulative roll-bonding, (2016), doi: [10.1016/j.matdes.2016.07.129](https://doi.org/10.1016/j.matdes.2016.07.129)

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Cu/C composites with a good combination of hardness and electrical conductivity fabricated from Cu and graphite by accumulative roll-bonding

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Abstract

Cu/C composites were prepared from Cu and graphite by accumulative roll-bonding (ARB) up to 30 cycles (N) with a 50% thickness reduction per cycle at room temperature. The microstructure and properties of the Cu/C composites were investigated. Results showed that ARB can remarkably decrease the size of graphite and improve the dispersion of graphite in the Cu matrix. Moreover, significant thickness reduction (down to ~5 graphene layers) of the graphite was found in the Cu/C composites fabricated by ARB. The microhardness of the Cu/C composites increases with increasing N and is ~3.3 times that of pure Cu for $N = 30$. The electrical conductivity of the Cu/C composites decreases slightly with increasing N , with a minimum of ~90% IACS for $N = 30$. Our study indicated that ARB can be an effective method for fabrication of Cu/C composites from Cu and graphite with a combination of hardness and electrical conductivity better than or as good as that of carbon nanotube or graphene reinforced Cu matrix composites as reported.

Keywords: Cu/C composites; accumulative roll-bonding; graphene; hardness; electrical conductivity

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