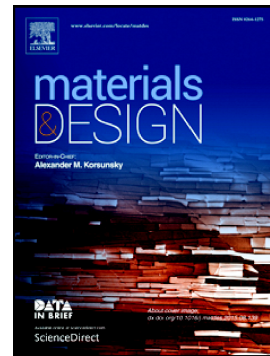


# Accepted Manuscript

Defect-free TiC/Si multi-layer electrical discharge coatings

J.W. Murray, R.B. Cook, N. Senin, S.J. Algodí, A.T. Clare



PII: S0264-1275(18)30486-6  
DOI: doi:[10.1016/j.matdes.2018.06.019](https://doi.org/10.1016/j.matdes.2018.06.019)  
Reference: JMADE 3989  
To appear in: *Materials & Design*  
Received date: 19 March 2018  
Revised date: 24 May 2018  
Accepted date: 10 June 2018

Please cite this article as: J.W. Murray, R.B. Cook, N. Senin, S.J. Algodí, A.T. Clare , Defect-free TiC/Si multi-layer electrical discharge coatings. *Jmade* (2017), doi:[10.1016/j.matdes.2018.06.019](https://doi.org/10.1016/j.matdes.2018.06.019)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Defect-free TiC/Si multi-layer electrical discharge coatings

J.W. Murray<sup>1</sup>, R.B. Cook<sup>3</sup>, N. Senin<sup>1</sup>, S.J. Algodí<sup>1,4</sup>, A.T. Clare<sup>1,2\*</sup>

<sup>1</sup>Department of M3, Faculty of Engineering, University of Nottingham, University Park, Nottingham, NG7 2RD, UK

<sup>2</sup>Department of Mechanical, Materials and Manufacturing Engineering, Faculty of Science and Engineering, University of Nottingham China, 199 Taikang East Road, University Park, Ningbo 315100, China

<sup>3</sup>National Centre for Advanced Tribology (nCATS), School of Engineering Sciences, Highfield Campus, Southampton, SO17 1EU, UK

<sup>3</sup>Department of Mechanical Engineering, College of Engineering, Al-Nahrain University, Baghdad, Iraq

### Abstract

The process of electrical discharge coating (EDC) may be used to deposit hard materials on conformal substrate surfaces. Next generation EDM'd components may exploit attachment phenomena to enhance recast layer properties, to avoid the need for recast layer removal. Here, a ceramic based composite layer was developed without cracking and porosity for the first time, using sequential coating using sacrificial TiC and Si electrodes. Attenuation of the discharge process by gap widening using Si debris in the gap explained improved layer properties. Composite coatings combining WC and TiC were also demonstrated, with good elemental intermixing. Attachment level was correlated strongly with melting point, with high melting point materials resisting ejection due to more rapid solidification. Nanoindentation showed the TiC and WC/TiC layers possessed the highest mean hardness

Download English Version:

<https://daneshyari.com/en/article/7216897>

Download Persian Version:

<https://daneshyari.com/article/7216897>

[Daneshyari.com](https://daneshyari.com)