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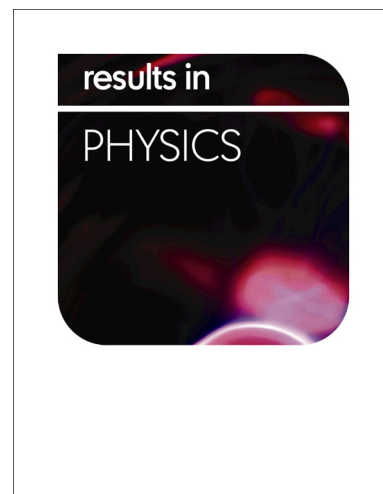
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# <sup>1</sup>Study of the Preparation of Cu-TiC Composites by Reaction of Soluble Ti and Ball-milled Carbon Coating TiC

Xuexia Xu <sup>a,b</sup>, Wenbin Li <sup>a,b</sup>, Yong Wang <sup>a,b</sup>, Guozhen dong <sup>a,b</sup>, Shangqian Jing <sup>a,b</sup>, Qing Wang <sup>a,b</sup>,  
Yanting Feng <sup>a,b</sup>, Xiaoliang Fan <sup>c</sup>, Haimin Ding <sup>c,\*</sup>

<sup>a</sup> State Grid Hebei Energy Technology Service Co., Ltd, Shijiazhuang, PR China

<sup>b</sup> State Grid Hebei Electric Power Research Institute, Shijiazhuang, PR China

<sup>c</sup> School of Energy, Power and Mechanical Engineering, North China Electric Power University, Baoding 071003, PR China

**Abstract:** In this work, Cu-TiC composites have been successfully prepared by reaction of soluble Ti and carbon coating TiC. Firstly, the ball milling of graphite and TiC mixtures is used to obtain the carbon coating TiC which has fine size and improved reaction activity. After adding the ball milled carbon coating TiC into Cu-Ti melts, the soluble Ti will easily react with the carbon coating to form TiC. This process will also improve the wettability between Cu melts and TiC core. As a result, besides the TiC prepared by reaction of soluble Ti and carbon coating, the ball milled TiC will also be brought into the melts. Some of these ball-milled TiC particles will go on being coated by the formed TiC from the reaction of Ti and the coating carbon and left behind in the composites. However, most of TiC core will be further reacted with the excessive Ti and be transformed into the newly formed TiC with different stoichiometry. The results indicate that it is a feasible method to synthesize TiC in Cu melts by reaction of soluble Ti and ball-milled carbon coating TiC.

**Keywords:** Composites; carbon coating TiC; Cu alloys; Ball-milling

## Introduction

Based on the high electrical and thermal conductivities, low cost, high ductility [1-3], Cu and its alloys have been widely used in many fields, such as electrical contacts, heat sink materials and resistance welding electrodes [4-6]. However, the relatively low hardness, low strength, and poor wear resistance limit their extensive

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\* Corresponding author. Tel: +86 312-7525031, Fax: +86 312-7525045

E-mail address: dinghaimin@ncepu.edu.cn

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