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# **In situ synthesis of TiC nano-reinforcements in aluminum matrix composites during mechanical alloying**

Vladimir A. Popov<sup>1\*</sup>, Manfred Burghammer<sup>2</sup>, Martin Rosenthal<sup>2</sup>, Anton Kotov<sup>1</sup>

<sup>1</sup> National University of Science and Technology “MISIS”, Leninsky prospect, 4, 119049 Moscow, Russia

<sup>2</sup> ESRF, 71 avenue des Martyrs, 38000 Grenoble, France

\*corresponding author e-mail address: popov58@inbox.ru

## **Abstract**

In this paper the possibility of fabrication of titanium carbide reinforcing nanoparticles inside an aluminum matrix by in situ synthesis during mechanical alloying will be discussed. The application of nanodiamond particles as carbon precursor for synthesis allowed obtaining TiC particles in nanosized form due to the size of initial nanodiamond particle of 4-6 nm. The developed composites were investigated by scanning electron microscopy, X-ray diffractometry, and differential scanning calorimetry.

**Keywords:** A: Metal-matrix composites (MMCs); Particle-reinforcement; B: Microstructures; D: Electron microscopy

## **1. Introduction**

The advancement of science and technology requires the development of new materials. On the one hand, modernized materials enhance the quality of various products and increase their service life, while on the other hand they create new technical solutions that are fundamentally different when compared to existing ones. Metal matrix composites [1-18] provide a new level of properties unattainable in conventional non-reinforced metals and alloys. However, composites with powder-like reinforcing particles still deserve considerable attention. Multiple studies have been dedicated recently to the development of nanocomposites. e.g., composites with nano-sized reinforcing particles. However, nano-powders in this application display a number of features,

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