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# POTENTIAL OF NIOBIUM CARBIDE APPLICATION AS THE HARD PHASE IN CUTTING TOOL SUBSTRATE

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## Abstract

Niobium carbide (NbC) exhibits important properties which make it an alternative for cutting tool material. Nowadays, the cutting tool market is dominated by the tungsten carbide, which is used in cemented carbide grades of tool materials. However, the research of a novel substrate material for cutting tool application requires mainly two aspects of study. The assessment of the cutting tool characteristics which influence the machining performance, and the machining experiments themselves. Thus, the features evaluating of the cutting tool made of niobium carbide, which indicate its potential application as the main hard phase in cutting tool substrates, were performed. Cutting tools analyses were carried out in parallel with machining experiments. Tool life experiments were carried out in external cylindrical turning conditions, in order to evaluate tool lifetimes and tool wear evolution of the cutting tools in study.

**Keywords:** Niobium carbide; Substrate material; Cutting tool; Machining.

## 1 Introduction

Improvement researches in coatings and geometries of the cutting tools are in constant discussion, although developments in new cutting tool substrate materials sector still have much to progress. Tungsten carbide (WC) is the main carbide used in hardmetals dispersed in a ductile binder, commonly the cobalt. Gant *et al.* [1], [2] have been simulating the abrasion

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