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# Complexion at WC-Co grain boundaries of cemented carbides

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## Abstract

The interface structure of tungsten carbide – cobalt grain boundaries in a WC-Co cemented carbide specimen is studied by aberration corrected high-resolution transmission electron microscopy. A two-atom thick chemically ordered layer is found on straight facets of a WC grain. No chemically ordered layers were found on curved segments of the same WC grain. The complexion appears to form only at certain facets of the interface, where the crystallographic orientation between the WC and Co crystal lattices results in high compatibility stresses across the interface. The complexion in form of an intermediate phase is present at such interfaces to accommodate the long-range stresses and to facilitate the lattice matching.

Keywords: nanocrystalline materials; grain boundaries; cemented carbides; complexion

## 1.Introduction

Cemented carbides on the basis of tungsten carbide with Co-based binders are well-known hard materials owing to their extremely favorable combination of hardness, toughness,