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# Effect of electric current on crystal orientation and its contribution to densification during spark plasma sintering

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## Abstract

In order to understand the underlying mechanisms of rapid densification during spark plasma sintering (SPS), the texture evolution of tungsten at different current densities was analyzed. It is found that texture of sample changes with current density under the same pressure and temperature. As the current density increases, the preferred orientation of tungsten crystal tend to rotate from (133) and (111) to (001), which is exactly a soft orientation and has the smallest deformation resistance. This current-induced rotation of crystal can be regarded as a non-thermal mechanism of electric current which contributes to the rapid densification of tungsten powder during SPS.

**Keywords:** Densification; Spark plasma sintering; Electric current; Crystal structure; Texture

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