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## Material structure and piezoresistive properties of niobium containing diamond-like-carbon films

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Abstract: Niobium-containing diamond-like carbon (Nb-DLC) films were deposited in a reactive high power impulse magnetron sputtering (HIPIMS) process, using a niobium target in an argon/acetylene atmosphere. Investigations of the electrical properties revealed their good suitability to serve as sensor material in strain gauges, with an elevated gauge factor of 35.5 and the possibility to adapt the temperature coefficient of the electrical resistance (TCR) to values near zero. Structure analysis of the crystallinity, chemical composition, and morphology of this material give insights of the correlations between structure and piezoresistive properties. A structure zone model in relation to the Nb content was developed, combining the results of the different measurements.

**Keywords:** strain sensor, gauge factor, DLC, piezoresistivity, Nb-DLC, biocompatible

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