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Electron Transport in Carbon-Based Nanocomposites for Memristor Nanosystems

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A technology has been developed for the synthesis of non-doped diamond-like carbon (DLC) and metal-containing carbon nanocomposites based on DLC doped with metal (Cu, Ni, Ti, Mo, W, Fe) for the manufacture of memristor memory elements. The structure of DLC and the features of electron transport in Pt|DLC|Pt and Pt|DLC:Ni|Pt systems with Ni content up to 40 at.% have been studied, and the percolation threshold has been determined. The nature and mechanisms of the nonlinearity of the current–voltage characteristics of the studied structures and further prospects for their application in memristor nanosystems are discussed.

Keywords: diamond-like carbon, physicochemical synthesis, electromigration, hybridization, percolation, resistive switching, spin-relative transport, beam plasma.