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High-T_c superconductivity in nanostructured Na_xWO_{3-y}: Sol-gel route ALI ALIEV, NanoTech Institute, University of Taxes at Dallas, Richardson, TX 75083 — Tungsten trioxide, WO_{3-y} infiltrated into various nanoporous matrix structures such as carbon inverse opal, carbon nanotubes paper, or platinum sponge and then intercalated with alkaline ions (Li^+, Na^+) exhibits a pronounced diamagnetic onset in ZFC magnetization in a wide range of temperatures, 125-132 K. Resistivity measurements show non zero jump and intensive fluctuations of electrical resistance below observed transition points. The observed magnetic and electrical anomalies in nanostructured tungsten bronzes (Li_xWO_{3-y}, Na_xWO_{3-y}) suggest the possibility of localized non-percolated superconductivity. The direct evidence of polaron formation from temperature dependence of EPR and photoemission spectra and formation of bipolarons in weakly reduced to WO_{3-y}, with 3-y typically in the order of 2.95 suggest bipolarons mechanism of a Bose-Einstein condensation of trapped electron pairs in doped WO_{3-y}. On the other hand the strong lattice instabilities in 2D systems like layered cuprates and tungsten bronzes place the upper limit on T_c. Than, the percolative self-organized mechanism on the metal/insulator interface like Na/WO_3 and $NaWO_3$/nanostructured matrix can facilitate the high T_c obtained in sodium bronzes infiltrated into inverted carbon opal or carbon nanotube matricies.

Ali Aliev
NanoTech Institute, University of Taxes at Dallas, Richardson, TX 75083

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