

Optical features of Ag/Au-WO_{3-x} plasmonic composite thin films

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Tungsten oxide (WO₃) is a wide gap semiconducting material, well known as a functional element of smart windows, electrochemical electrodes for water splitting reactions, etc. One of the ways to extend the practical application of WO₃ is the modification of its electronic properties by chemical doping and formation of composites.

In this work, plasmonic composite thin films based on tungsten oxide (WO₃) matrix and Ag/Au nanoparticles (NPs) were deposited by RF magnetron sputtering. As deposited thin films have amorphous substoichiometric WO_{3-x} matrices with isolated noble metal NPs with average sizes of about ~3 nm. The resonance absorption peak is located at 580±10 nm and 430±10 nm for Au and Ag doped WO_{3-x} thin films, respectively. Depending on Ag/Au ratio, composite films demonstrate tunable plasmonic resonance absorption peak.

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