46b Synthesis of Metal Oxide Nanowires by Oxygen Plasma Treatment [Invited]

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A method for synthesizing large quantities of metal oxide nanowires is presented. Metal foils are exposed to highly reactive oxygen plasma. Due to interaction of oxygen atoms on the foil surface a thin oxide film grows spontaneously. In a limited range of plasma parameters the growth of the oxide is heavily unisotropic, leading to a formation of bundles of well-oriented nanowires. After the plasma treatment, the metal foil is completely covered with long nanowires of the diameter of the order of 10 nm. The growing phenomenon is demonstrated for the case of niobium oxide. Possible mechanisms involved in the formation of nanowires during oxygen plasma treatment are presented and discussed.