Plasma synthesis of oxide materials for photonics, energy and water treatment applications

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Innovation in materials science and engineering resides in our ability to design new materials with tailored properties (electrical, optical, magnetic, etc.) by controlling their microstructure. One of the most powerful means to uniquely arrange matter at such scale is to use plasmas due to their unique ability to provide simultaneously a variety of particles such as ions, neutral atoms and radicals. In this presentation, we will focus on the growth of various oxide materials in the form of thin films, including undoped and doped vanadium dioxide and titanium oxide using either pulsed laser deposition or dielectric-barrier discharges. There are exploited for various applications including photonics, energy and water treatment.

Biography

Mohamed Chaker has been a professor at the Institut National de la Recherche Scientifique (INRS) in Varennes, Quebec, Canada since 1989. Holding a Tier 1 Canada Research Chair in Plasmas applied to micro and nanomanufacturing technologies since 2003, he has published over 330 articles in peer-review journals (16000 citations, H-index=68 according to Google Scholar) in various domains, including advanced plasma sources characterization (high-density plasmas and laser-induced plasmas) for applications to thin film and nanomaterials synthesis, nanometer pattern transfer and device fabrication. From 1999 to 2002, he has been the director of the Center Energie et Matériaux of INRS, then from 2002 to 2005, the director of the Center Énergie Matériaux Télécommunications. He played a leadership role in the development of Quebec consortia (Prompt-Québec, NanoQuébec). From 2005, he is the director of the Laboratory of Micro and Nanofabrication (LMN) of INRS.