Abstract Submitted
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**Time Resolved Optical Emission Spectroscopy during Pulsed DC Sputter Deposition of TiO2 Thin Films**[1] WEIDONG ZHU, JOSE LOPEZ, ABE BELKIND, KURT BECKER, Stevens Institute of Technology, Hoboken, NJ 07030 — Time resolved optical emission spectroscopy (TR-OES) is used to analyze pulsed DC magnetron plasmas during the sputter deposition of $TiO_2$ thin films. The studies are focused on the temporal behavior of the emission lines of atomic titanium, argon and oxygen in three chosen emission windows (386 nm to 427 nm, 747 nm to 782 nm and 824 nm to 858 nm) during the *off-time* and the *on-time* of the pulsed DC plasma. Single- and double-exponential fits were used to describe the various optical emissions during the *off-time* of the plasma. The various decay constants are correlated with the disappearance of the fast beam-type electrons in plasma once the power is turned off as well as to the disappearance of Ar metastables and Ti and O atoms. We find a slow increase of the optical emission intensities that follow the cathode current (with or without an intensity overshoot) when the power is turned on at the beginning of the *on-time*.

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