

Article

Tantalum Oxide Thin Films Sputter-Deposited by Oxygen Gas Pulsing

Nicolas Martin ^{1,*}, Jean-Marc Cote ¹, Joseph Gavaille ¹ and Valérie Potin ²

¹ Institut FEMTO-ST, SUPMICROTECH-ENSMM, CNRS, 15B, Avenue des Montboucons, CEDEX, F-25030 Besancon, France; jeanmarc.cote@femto-st.fr (J.-M.C.); joseph.gavaille@ens2m.fr (J.G.)

² Laboratoire Interdisciplinaire Carnot de Bourgogne (ICB), UMR 6303, CNRS, University Bourgogne Franche-Comté, 9, Avenue Alain Savary, BP 47 870, CEDEX, F-21078 Dijon, France; valerie.potin@u-bourgogne.fr

* Correspondence: nicolas.martin@femto-st.fr; Tel.: +33-363-08-2431

SECTION I: Intensity profile from HRTEM cross-section observations

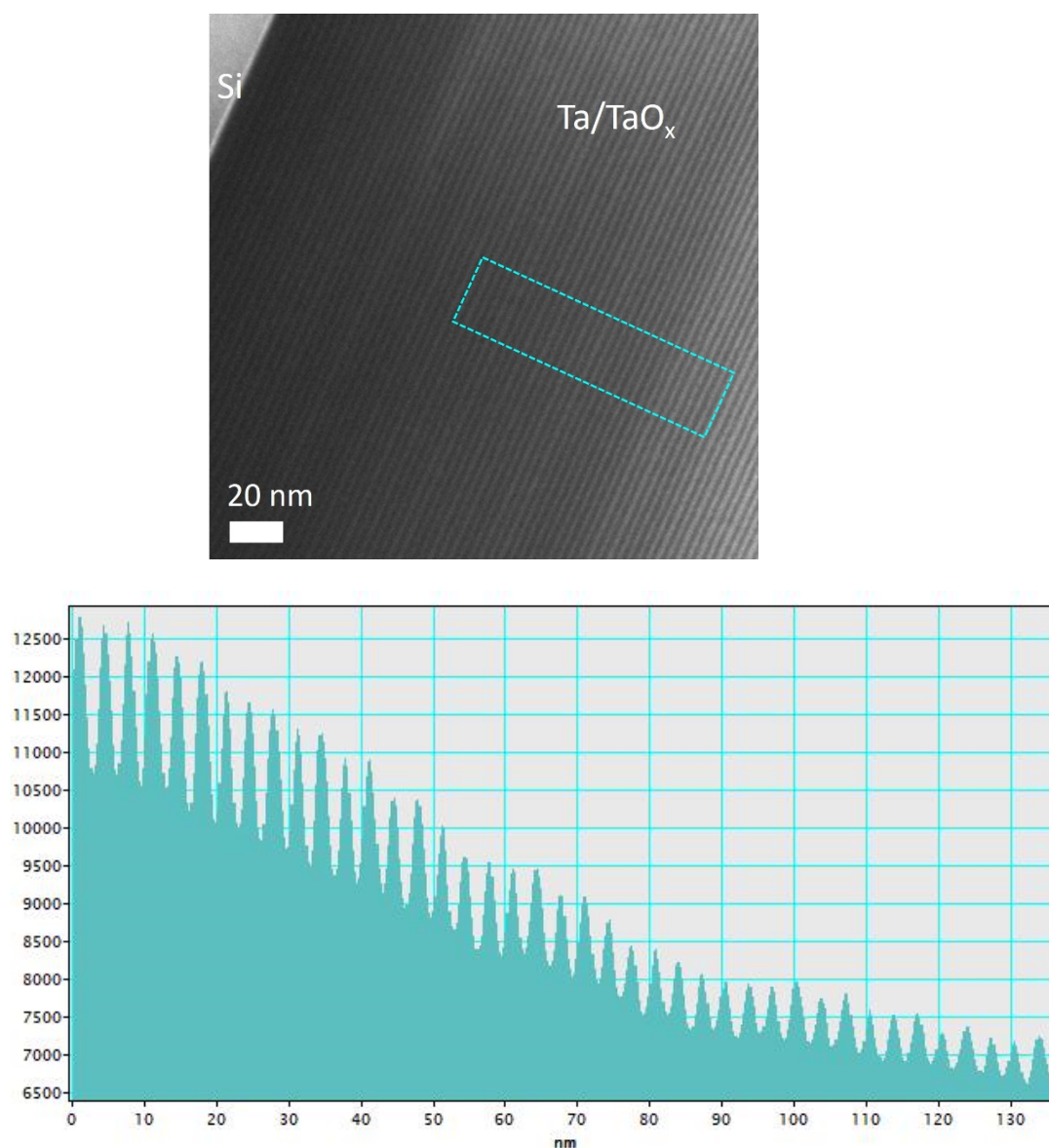


Figure S1. Intensity profile for a Ta/TaO_x periodic multilayer prepared with an oxygen injection time $t_{ON} = 3$ s. It has been extracted from an HRTEM image (blue-green area, Figure 5a) and points out the regular stacked sequence. Lower and higher intensities correspond to metallic and oxide sub-layers, respectively. The background decrease is linked to the variation of the specimen thickness (crossed by the electron beam) after TEM specimen preparation.

SECTION II: EDX analyses

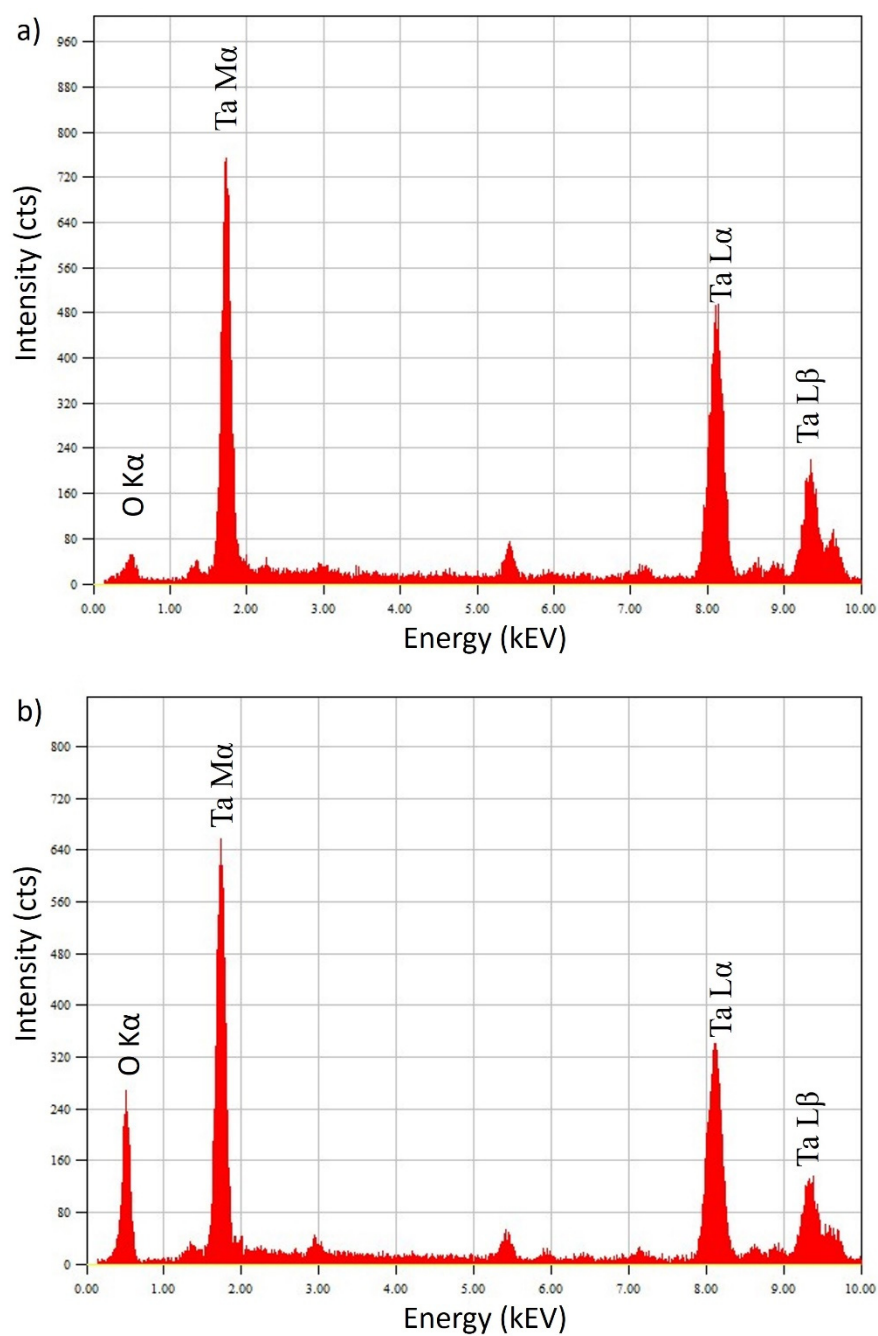


Figure S2. Typical EDX spectra recorded in a) a Ta sub-layer (Ta: 80 at. %, O: 20 at. %) and b) a TaO_x sub-layer (Ta: 30 at. %, O: 70 at. %). Atomic quantification was performed with the ratio method.

SECTION III: Electron diffraction

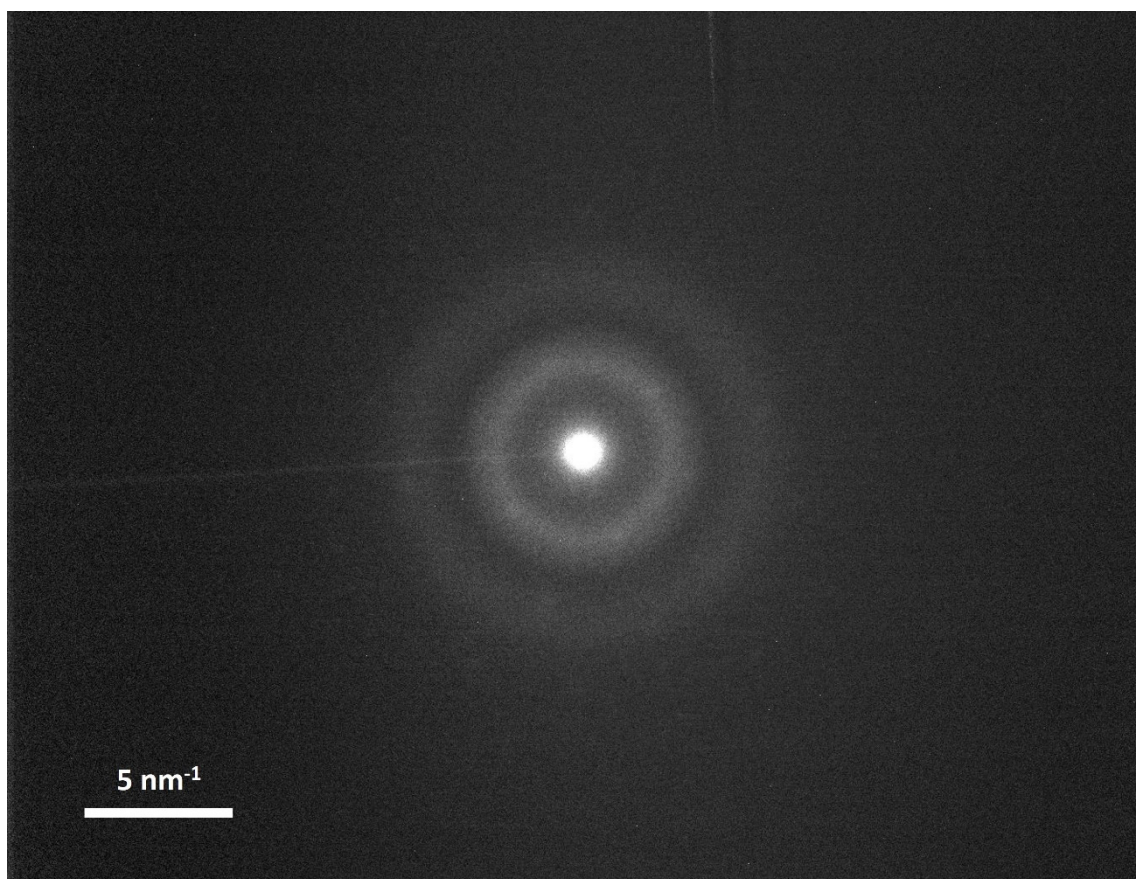


Figure S3. Typical diffraction pattern obtained for TaO_x films prepared with t_{ON} injection time higher than 3 s. It confirms the amorphous character of TaO_x, already pointed out by XRD (Figure 3).