

PO4029

**Analysis of the behaviour of the reactive species in reactive magnetron sputtering of oxides**Wouter Leroy<sup>1</sup>, Stijn Mahieu<sup>1</sup>, Rosita Persoons<sup>2</sup>, Diederik Depla<sup>1</sup><sup>1</sup>Ghent University, Gent, Belgium <sup>2</sup>VITO, Mol, Belgium

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Although a widely spread and used technique, Reactive Magnetron Sputtering still holds quite some mysteries in fundamental processes. The behaviour of the reactive gas continues to be the "black box" of theoretic models, while for experimentalists it is a necessary yet obscure process. Not only the way reactive gas particles interact with the substrate, but also the creation and motion of all the different reactive gas species in the plasma, are research areas with vast voids of data.

This work digs into reactive magnetron sputtering with oxygen as reactive species. The reactive behaviour during thin film growth at the substrate level was explored in previous work (ref?), where the reaction mechanism during deposition was defined as a co-deposition process rather than the classical chemisorption approach. To gain more insight in this co-deposition mechanism of the reactive gas and the metallic species, more mass spectrometry studies were combined with compositional analysis of deposited layers. These somehow counterintuitive results are reconciled with well-established beliefs on the reactive process.

Furthermore, plasma studies by means of an energy-resolved mass spectrometer will be presented, giving details on the presence of atomic oxygen in the plasma. A difference in the presence in the plasma of atomic oxygen was noticed for different metallic targets.

**Keywords**

Reactive Magnetron Sputtering

Atomic Oxygen

Plasma Diagnostic

Mass Spectrometry

Oxides