

PO3015

**General review of the influence of experimental parameters of RF reactive magnetron sputtering to get columnar, equiaxed nanograined or amorphous oxynitrides**Valerie BRIEN<sup>1</sup>, Pascal Boulet<sup>2</sup><sup>1</sup>CNRS Institut Jean Lamour, Vandoeuvre lès Nancy, France <sup>2</sup>IJL (CC X-gamma) CNRS, Vandoeuvre lès Nancy, France

valerie.brien@univ-lorraine.fr

Our team has now a few years' experience in synthesizing doped aluminium nitride films by the technique of R.F. magnetron reactive sputtering. The poster will give a complete overview of the work and will try to gather the main elements of the past studies. It will also include the main conclusions of the very recent results (presented in oral) obtained on crystallographic localization of the rare earth inside the lattice by spatial resolution techniques and more specifically by laboratory XRD (X-ray Diffraction).

We will recall the morphology map built according to the generator power, the pressure of the working plasma. We will describe the crystalline morphologies of the different zones of the map that were identified by TEM (Transmission Electron Microscopy). We will underline the role of oxygen presence and will present the systematic study we have performed to identify the effect of oxygen on the crystalline morphology of nitrides. We will also present the morphologies obtained by applying a variable bias between the target and the substrate. We will situate the work by comparing to the well-known Structure Zone Diagrams built by Movchan et al [1] for some metals and oxides deposited by evaporation, by Thornton [2] for metals deposited by sputtering and more recently by Anders [3] for polycrystalline films deposited by filtered cathodic arcs or HIPIMS (high power impulse magnetron sputtering).

References

[1] Movchan BA, Demchishin AV. Fiz Met Metalloved 1969:653.

[2] Thornton JA. Annu Rev Mater Res 1977;7:239.

[3] Anders A. Thin Solid Films 2010;518:4087.

**Keywords**

RF magnetron sputtering

oxynitrides

Structure zone model

morphology