

## **Functional oxides on Silicon and Sapphire substrates for photonic applications**

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Intensive researches are currently conducted on the miniaturization of devices and on the combination of photonics and electronics to decrease the power consumption and to create novel functionalities. In this context, the hybrid integration of functional oxides on silicon photonic devices is a promising approach to bring other properties including multiferroicity, piezoelectricity, nonlinear optical properties in silicon photonics platform.

Our work focuses on the integration of Yttria-Stabilized Zirconia (YSZ) functional oxide on sapphire substrates and on silicon. The common aim for both integrations is to induce nonlinear optical effects at the wavelength around 1550nm, thanks to strain tuning in full oxide- or in hybrid oxide/Si- structures.

The oxide thin layers are epitaxially grown by pulsed laser deposition on sapphire and silicon and characterized by several complementary techniques including X-ray diffraction, AFM, SEM, TEM microscopies, and Raman spectroscopy. The fabrication of photonic structures (gratings coupler, waveguides) and first optical propagation results will be presented.