*Three-color plasmon-mediated reduction of diazonium salts over metasurfaces*, Denis A. B. Therien, Danielle M. McRae, Claire Mangeney, Nordin Felidj and François Lagugne-Labarthet, *Nanoscale Adv.*, 2021, **3**, 2501-2507

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## Abstract:

Surface plasmon-mediated chemical reactions are of great interest for a variety of applications ranging from micro- and nanoscale device fabrication to chemical reactions of societal interest for hydrogen production or carbon reduction. In this work, a crosshair-like nanostructure is investigated due to its ability to induce local enhancement of the local electromagnetic field at three distinct wavelengths corresponding to three plasmon resonances. The structures are irradiated in the presence of a solution containing diazonium salts at wavelengths that match the resonance positions at 532 nm, 632.8 nm, and 800 nm. The resulting grafting shows polarization and wavelength-dependent growth patterns at the nanoscale. The plasmon-mediated reactions over arrays of the crosshair structures are further investigated using scanning electron microscopy and supported by finite domain time domain modelling revealing wavelength and polarization specific reactions. Such an approach enables nanoscale molecular printing using light source opening multiplexing applications where different analytes can be grafted under distinct opto-geometric conditions

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