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High Optical Quality Organic Thin Films for Nonlinear Photonics Fabricated by Molecular Beam Deposition MARTEN BEELS, Lehigh University, IVAN BIAGGIO TEAM[1] — We use small donor-acceptor substituted organic molecules that sublimate without decomposition to fabricate organic thin films by organic molecular beam deposition. These thin films have thicknesses of the order of micrometers and are well adapted for integrated nonlinear optics. These films are essentially amorphous, without the formation of microcrystals. They combine a high third-order susceptibility of the order of 1000 times that of fused silica with a high optical quality. Surface roughness is below +/- 5 nm for micrometer thick films. The films have been shown to be durable and robust, with a long shelf life (¿2 years). We successfully integrated such films with silicon-on-oxide waveguides which have been used to demonstrate ultrafast all-optical switching on the silicon photonics platform, successfully demultiplexing a 170 GBit/s signal to 42 GBit/s.

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