

Bachelor / Master Thesis:

Development and Characterization of Hermetic Sealing for Silicon-Organic Hybrid EO Modulators

The silicon-organic hybrid (SOH) integration concepts relies on the combination of advanced organic electro-optic (EO) materials with silicon waveguide structures. It thus merges the processing advantages of silicon photonics with the large EO activity of specially engineered organic materials. In recent years it was demonstrated that SOH modulators outperform other modulator platforms in terms of modulation efficiency, energy consumption, and achievable data rate [1]. Recently, we have also demonstrated thermally stable operation of the modulators at temperatures of 85 °C and we have identified the remaining roadblock for industrial applications of SOH devices: The light induced oxidation of the organic material, an effect that has, e.g., also delayed the industrial adoption of OLEDs. Previous studies have shown that this effect can be eliminated by an appropriate hermetic sealing of the SOH devices.

Your tasks:

- Get familiar with integrated optics, the SOH technology and typical optical and electrical measurement techniques
- Identify and characterize appropriate sealing materials
- Develop and extend tools for applying the sealing materials to SOH devices
- Characterize sealed SOH devices using state-of-the art chip coupling setups.

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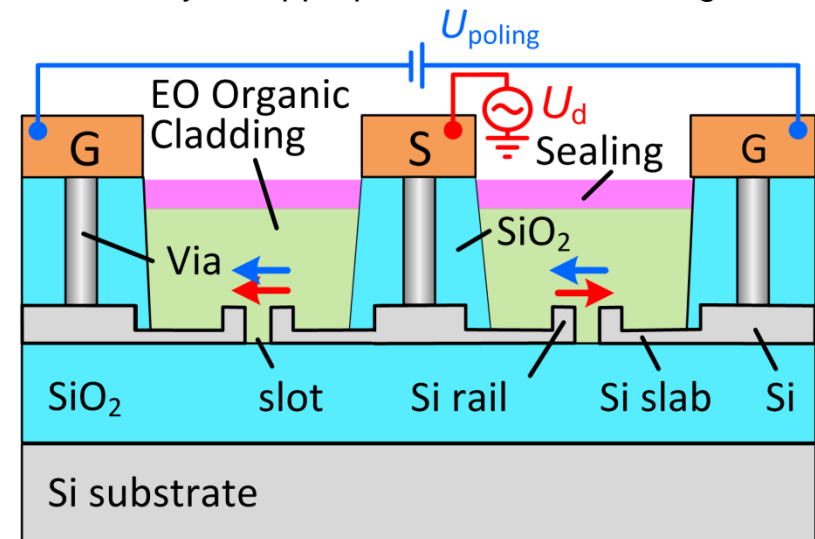


Figure: SOH device concept

[1] C.Koos et al., "Silicon-Organic Hybrid (SOH) and Plasmonic-Organic Hybrid (POH) Integration", *J.Lightwave Technol.* 34, 01-13 (2016)