

Glass and nanocrystalline diamond, a platform for 3D micro- and nanodevices

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The glass industry recently developed microstructures in glass slabs, such as through glass vias, that are most suitable for fabricating micro- and nanodevices [1-3]. It will be explained that glass slabs are also ideal substrates for growing nanocrystalline diamond (NCD) on, which paves the way for the development of a glass and NCD platform for 3D micro- and nanodevices.

Guided by this, we recently developed a technology for fabricating NCD structures on glass slabs. A part of this technology will be presented together with a model, which is based on first principles. With the model, it will be shown how to construct a relation to analytically describe phenomena that we observed during developing our technology. These phenomena are related to reaction and diffusion limited processes of glass etching with hydrofluoric acid.

- [1] S. Takahashi et al. IEEE 63rd Electronic Components and Technology Conference, 2013, pp. 348–352.
- [2] R. C. Burkett et al. Methods for forming vias in glass substrates, US Patent US 2015/0060402A1, 2015.
- [3] A. C. Jaramillo et al. Articles having holes with morphology attributes and methods for fabricating the same, US Patent US 2018/0068868 A1, 2018.