

A novel approach for comb-drive driving systems used in MOEMS

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Lab4MEMS II is a Joint Undertaking project involving 19 industrial, research and academic partners under the lead of STMicroelectronics. The project combines several of the Key Enabling Technologies (KET) as indicated by the High Level Group - namely nanotechnology, micro-electronics and advanced packaging - pursuing the setup of a pilot line for innovative Micro-Opto-Electro-Mechanical-Systems (MOEMS). Following a More-Than-Moore approach on novel technologies Lab4MEMS II is focused on the development, testing and validation of devices such as micro-projectors, 3D infrared scanners and near-infrared micro-spectrometers. Sensing and manipulation of optical signals using integrated mechanical and electrical systems, together with advanced packaging technology are key aspects in the development of next generation MOEMS devices. The success of the project will open the way to the worldwide commercialization of future applications such as contactless commanding of devices, holographic imaging and smart driving.

In the frame of Lab4MEMS II ITE is developing an innovative MOEMS system integrating micro-mirrors, optical elements and dedicated electronics to allow the sensing of large cantilever arrays with the use of a single laser source and a small sized position sensitive detector. The goal is to provide a compact, versatile and cheap portable device with high sensitivity.

As far as movements of the optical parts are concerned the most important element in MOEMS is the driving system. In this article authors present the idea to make a comb-drive system in SOI, based on the original modification of the known method using subetching of the oxide layer in pairs of hydrofluoric acid. In this approach a sequence of three plasma processes is used, in order to define the shape and separate manufactured structures from the substrate.

