## Magnetic Nanomembranes

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Abstract

In our everyday life, we are surrounded by electronic sensing devices designed in a way to meet requirements for a certain application, which is determined primarily by their shape and size. In this respect, the natural question, which surprisingly has only recently been raised, is can one create electronics that can be reshaped on demand after its fabrication? After introducing this ground-breaking paradigm, the so-called flexible electronics became a dynamically developing research area with already a variety of flexible devices commercially available: electronic displays, light-emitting diodes, integrated circuitry, to name a few.

Special attention has been paid to the family of stretchable electronics which combines advantages of being flexible with the high speed of conventional semiconductor-based electronics. Until recently, the main focus was on fabrication of shapeable high-speed electronics [1] and optoelectronics [2]. However, the family of stretchable electronics is not limited to these two members. Only very recently, we reported for the first time the fabrication of stretchable magnetoelectronics [3, 4].

In this talk I will focus on fabrication of stretchable magnetoelectronics and on its various application aspects. Due to their flexibility and stretchability, these devices are unique as the same initial sensor can be used for multiple purposes: an elastic magnetic sensor integrated in a fluidic tubing can be applied for therapeutic purposes [5]. Alternatively, the same sensor can be mounted on a curved surface of a stator in a tiny gap between rotor and stator in electrical machines to provide a regulation for the rotor position. Due to the low price of elastic polymeric substrates which can be used, shapeable magnetic sensors are much cheaper compared to their rigid semiconductor-based counterparts, thus opening the door for large area sensor fabrication, which is a break-through in conventional sensor engineering.

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[4] I. Mönch et al., ACS Nano 5, 7436 (2011).
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