TRR 80 Seminar

Am Dienstag, den 25. Januar um 16:00 Uhr

spricht

Prof. Dr. Paul Muralt

Ceramics Laboratory, Ecole Polytechnique Federale de Lausanne
EPFL, Switzerland

über das Thema

Piezoelectric Thin Film Micro Structures: From Fabrication to Energy Harvesting

The field of piezoelectric thin film micro and nano systems combines an exciting richness of potential applications with many attractive scientific topics on materials processing and physical properties. This talk will address fabrication and performance issues of piezoelectric PZT ($Pb(Zr,Ti)O_3$) an AlN thin films and their functional composite structures in MEMS devices. The crystalline quality of the material plays a crucial role, as a strong piezoelectricity is an effect of the crystalline lattice. For applications, one cannot compromise on materials performance. Whereas the sputter deposited AlN does not pose much problems to integration into silicon MEMS devices, a number of integration tasks must be well accomplished to obtain a dense, phase pure material with controlled texture, and a suitable film thickness in case of PZT. In the ferroelectric PZT, domain issues lead to complications, but as well to large opportunities for improving the response of the film. Results on various basic functional structures, with their applications will be shortly presented, the focus is however on energy harvesting. During recent years, energy harvesting from vibration and motion sources has attracted much interest. Electrical power generators based on piezoelectric materials were investigated, first as flexible piezoelectric bulk composite materials containing PZT ceramics, and later also as MEMS devices based on thin films, or even nanowires. In case of micro power devices, the main target applications are wireless communication, sensors, and wireless sensors. The progress in piezoelectric thin films and MEMS technology has lead to the development of demonstration devices that show sufficiently large power outputs and voltage levels, i.e. more than several 100 $\mu W/cm^2$ at over one volt.

Gäste sind herzlich willkommen!
Der Vortrag findet im Seminarraum 288/Physik-Süd, Universität Augsburg statt.

Gastgeber: Dr. Stephan Krohns
www.trr80.de