Electronics packaging for multi-functional and biomedical sensor systems

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The development of electronic packaging technologies for systems as a multi-functional smart and interconnected structure has become an important field of research in industry and at research institutions worldwide. Main objectives are the integration of different electronic components and functionalities like sensors, displays, microcontroller ICs, antennas, batteries and passive components on a flexible substrate, or a board or interposer.
Thin silicon chips, foil integration technologies, 3D stacking of functional layers as well as 2.5 or 3D interposer technologies enable such new system concepts. Co-integration of electrical and optical wave-guides is a consequence in order to cope with the increasing demand of increasing the bandwidth efficiency in communication systems. Additive manufacturing, 3D printing as well as self-assembly and self-alignment processes seems to be a possibility to complement with classic thin- and thick-film technologies and are needed to meet the performance, reliability, energy and cost requirements of multi-functional sensor systems in the near future. New approaches like the "functional substrate" need to be developed to bridge the gap between the nano-sensors device level and the micro-systems
integration level.
Such multi-level heterointegration is of relevance for many system integration fields from functional electronic surface i.e. “electronic skin” integrated to many things for “the internet of things and humans”, power electronics modules for automotive and home, bio-medical and implantable electronics, but, also for highly performant 3D integrated

communication systems in the future for tactile internet and 5G mobile networks.