

Conformable Electronics: Recent Developments towards Robust Printed Devices

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Printed Electronics technology and hybrid devices have the potential to combine compact high-performance circuit integration on thin, flexible and elastic substrates. Reliability and robustness of hybrid printed electronics is a major challenge for the implementation of the technology in practical applications such as flexible displays, smart labels, photovoltaic devices, sensing devices, and radio frequency identification (RFID) tags. Particularly, interfaces between the rigid components and the soft substrates represent the major issue due to mechanical incompatibility. Our recent work has focused on overcoming this drawback, by emphasizing the study of materials elasticity role and their deposition process, both for inks, adhesives and encapsulants. Furthermore, this strategy settles the direction towards conformable devices, by promoting stretchability up to elasticity. In this talk, materials, including substrates, conductive inks, based on silver or carbon nanoparticles, processing and curing and deposition techniques such as screen and inkjet printing in lab scale sheet to sheet up to pre-industrial roll to roll are discussed, in addition to recent developments in demonstrators ranging from conformable skin moisture sensor to LED hybrid elastic systems are presented, depicting processes and characterization involving electrical performance under mechanical strain and stability to ambient conditions.

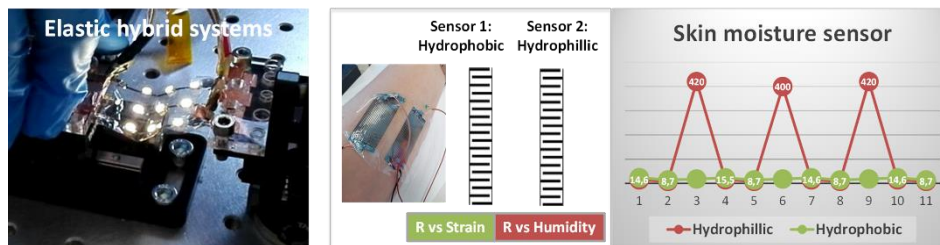


Fig. 1: Examples of hybrid and conformable printed electronics systems.