

‘Transient electronics’: Biocompatible/biodegradable electronic devices dissolve in body, environment

A remarkable feature of silicon-based integrated system is its capability to last forever without any functional and physical variation, in almost any practical purposes. Recent works demonstrate a new class of silicon electronics that has the opposite behavior -- it physically disappears in water or biofluids, in a controlled fashion, at prescribed times and with programmed rates. This ‘transient’ technology opens up completely new application opportunities for semiconductor devices in areas, such as implantable medical devices that exist for medically useful timeframes but then dissolve and disappear completely by resorption into the body. This talk summarizes recent work on ‘transient’ technology, ranging from fundamental chemistry of the key materials, to development of various components and systems for biosensors, to in vivo toxicity tests for biocompatibility.