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Green electronics: Biodegradable, biocompatible, bioresorbable materials and devices for sustainable future

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Portable electronics users tend to upgrade their devices much more frequently as new technologies offering more functionality and more convenience become available. For example, cell phone users tend to buy new cellphones every 2 to 3 years. Thus, large quantities of working electronics are discarded constantly as new ones are available. A report published by the U.S. Environmental Protection Agency in 2012 showed that about 152 million mobile devices are discarded every year, of which only 10 percent is recycled-a legacy of waste that consumes a tremendous amount of natural resources and produces a lot of trash made from expensive and non-biodegradable materials like highly purified silicon. This will not only lead to a large amount of consumption of our limited natural resources but also generate a large amount of waste that could pollute our environment. Thus, it would be desirable to develop a technique for creating electronics using an alternative substrate that is inexpensive and biodegradable or even compostable while maintaining high-performance standards. This will not only drastically reduce the usage of Si but also reduce the accumulation of persistent waste. In recent years, there are several attempts to overcome such issues by employing bio-compatible materials in substrate or device. Such devices or substrates are made out of biodegradable or bioresorbable materials such as cellulose fibers, polymers. Thus, bio-degradable or resorbable electronics will protect our environment by reducing the volume of electronic-waste.

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