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Professors Hyung-Han Yoon and Kwanghee Lee have developed electronic devices for human transplants (National Research Foundation of Korea)

☐ Korean researchers have successfully developed electronic devices that enhance the performance and stability of electronic medical devices for human transplantation. GIST (President Seung Hyeon Moon) Professors Hyung-Han Yoon and Kwanghee Lee have developed a high-performance plastic electrolytic electronic device that operates in the body for a long period of time after sterilization at high temperature and high pressure.

☐ Organic bioelectronic * devices are attracting attention as the core technologies of next-generation human medical implantable medical devices based on their characteristics of bio-signal sensing ability, mechanical flexibility, biocompatibility, and low process cost, which are superior to conventional inorganic and carbon-based devices. However, it has been pointed out that the internal stability required for the use in the human body require high-temperature and high-pressure sterilization treatment, which are weak points.

* Organic bioelectronics is the application of organic electronic material to the field of bioelectronics.

□ To overcome these limitations, the researchers tried to achieve high performance and stability by using a basic material engineering approach instead of using existing improvement methods of adding additives such as surfactants and crosslinking agents.

□ The researchers analyzed the microstructure of the conductive polymer, which is one of the most representative materials in the development of organic bioelectronic devices, and found that device performance and aqueous liquid phase stability of the electrolyte transistor are maximized by inducing highly crystalline molecular rearrangement of the active layer polymer material without additives.

□ The researchers also confirmed that bioelectronic devices using plastic electronic materials can maintain high performance and high stability even after autoclaving at high temperature and high pressure, which is often used in microbial sterilization of bio-transplantable medical devices, due to the stability of such highly crystalline polymers.

□ Professor Hyung-Han Yoon said, "Performance improvement and solution stability of conductive polymer materials essential for the development of bioelectronics are achieved through relatively simple service-mapping crystal techniques. This will also contribute to commercialization of bioelectronics devices and development of flexible photovoltaic sensors based on internet of things and water-based organic electrode-based catalysts."

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