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Mobile Apps II

Week 12 Summaries

Article 1: Using ultrasonic waves to charge underwater and body-implanted electronic devices

New research led by Dr. Hyun Cheol Song from the Korea Institute of Science and Technology opens opportunities to recharge underwater and body implanted electronic devices. Inside of using Electromagnetic (EM) waves, which cannot pass through water and metal easily, and generate heat that can cause harm to human bodies, ultrasonic waves were used. A model was designed to receive and convert ultrasonic waves into electrical energy. This is done by using the trio electric principle, which allows small mechanical vibrations to be converted into electrical energy. The device is in clinical phase and was tested by charging 8mW powder from a distance of 6 cm, which was enough to operate 200 LEDs or communicate with Bluetooth sensors underwater. Further research on the device could lead to successfully being capable of recharging implants thus eliminating the need to do procedures.

Article 2: Using ultrasonic waves to charge underwater and body-implanted electronic devices

Farbod Alijani and his team at Delft University of Technology came upon the idea of a single bacterium creating sound with the help of Graphene. Graphene is a form of carbon consisting of a single layer of atoms, making it very sensitive to movements. Using E. Coli as the first test bacterium, they found that when the bacterium adhered to the graphene drum, it generated random oscillations. The amplitudes of which were as low as a few nanometers which is detectable. The small oscillations are due to the flagellum of the bacterium which beat on the graphene drum. The application of this research can be used to see if a bacterium is resistant to an antibiotic. If oscillations continued then there is no effect of the antibiotic, but if susceptible to the drug, then the vibration would decrease, ultimately stopping after one or two hours. The future success of this method could lead to an effective diagnostic of antibiotic resistance.

Bibliography

@misc{national research council of science & technology_2022, title={Using ultrasonic waves to charge underwater and body-implanted electronic devices}, url={https://scitechdaily.com/using-ultrasonic-waves-to-charge-underwater-and-body-implanted-electronic-devices/}, journal={SciTechDaily}, author={NATIONAL RESEARCH COUNCIL OF SCIENCE & TECHNOLOGY}, year={2022}, month={Apr}, abstract={ This article is interesting because of the innovative idea which is often seen to wirelessly charge smartphones and smartwatches being implemented to be used for implants and underwater devices. It is important because there is always a risk when a surgery is performed and even if it just for replacing an implant battery, it can be costly so this would eliminate that risk in the future.}}

@misc{delft university of technology_2022, title={What do bacteria sound like? bacterial soundtracks revealed by nanotechnology}, url={https://scitechdaily.com/what-do-bacteria-sound-like-bacterial-soundtracks-revealed-by-nanotechnology/}, journal={SciTechDaily}, author={Delft University of Technology}, year={2022}, month={Apr}, abstract={ This is interesting because of the sheer size of a bacterium; you would think it would be impossible to hear something see which under a microscope. It is important because this method only using a single bacterium and could come in handy if there a small culture of bacteria to be tested and it would be a faster test then those done in labs which can take at least a day.}}