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Characterization of screen printed Ag-PDMS flexible electrode for electrical muscle stimulation (EMS) (Article)

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Abstract

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Electrical Stimulation is vital for maintaining muscle tone and strength particularly in improving muscle conditions. However, commonly used electrodes for muscle stimulation are flat, solid and have a fixed curvature and therefore cannot conform to the surface of the body. In this paper, a newly developed silver (Ag)- Polydimethylsiloxane (PDMS) flexible electrode for electrical muscle stimulation was developed. The electrodes were fabricated using screen printing for both single and array designs. The Ag-PDMS composite was developed to allow electrode pattern to be transferred properly on the PDMS substrate because due to same material property.Subsequently, the Ag-PDMS sheet resistance (R) which related to the conductivity of the electrode, was characterized. The R increases each time strain was given to the substrate (0.1cm in each test) with the initial value of 0.7Ω and 75Ω for single and array electrode respectively.To evaluate the functionalities of the electrodes, the Mechanomyogram (MMG) signals were measured by using an equipment called USBamp and a commercial Electrical Muscle Stimulator. Results show that the functionality of the fabricated single electrodes were comparable to the commercial one.

Author keywords

Ag-PDMS EMS MMS Screen printing Stretchable electrode

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