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Silver nanowire-composite electrodes for long-term electrocardiogram measurements

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Highlights

- The Ag nanowire layer is simply fabricated and guarantees the high quality of the signals.
- Carbon nanotube-adhesive polydimethylsiloxane layer is self-adhesive and can achieve robust contact between the electrode and skin.
- The fabrication method is simple and inexpensive.

Abstract

Composite electrodes are fabricated for long-term electrocardiogram (ECG) measurements. The electrode consists of a polydimethylsiloxane base, silver nanowire layer, and adhesive layer. The adhesive layer is fabricated by loading carbon nanotubes into adhesive polydimethylsiloxane. An electrode patch consisting of three composite electrodes and an adhesive polydimethylsiloxane layer is fabricated and combined with a wireless acquisition system to obtain ECG measurements. The composite electrode patch is self-adhesive and can conform to the skin, achieving robust contact between electrode and skin and thus decreasing motion artifacts. The composite electrodes combined with the measurement system are successfully used for wireless long-term recording of ECG signals. Continuous testing for 8 days shows that the ECG signal amplitude decreases slightly after wearing for 6 days and can be largely recovered by cleaning with ethanol. The composite electrodes are flexible and exhibit good ECG performance, and therefore can be used in wearable medical monitoring systems.

Keywords

composite electrode; adhesive polymethylsiloxane; silver nanowire; electrocardiography.

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