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Soft wearable ionic polymer sensors for palpatory pulse-rate extraction

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HIGHLIGHTS

- **Development of IPMC sensing device.**
- **Use of mechano-electrical property of IPMC in sensing pulse rate**
- **Signals generated by IPMC for pulse rate are diagnostic**
- **Possible use in cardiac monitoring**

ABSTRACT

IPMC (Ionic-Polymer-Metal-Composites) based sensing applications are gaining momentum owing to their flexible structure as well as bio-compatible attributes. The present article explores the domain of bio-potential measurements by using a soft-wearable IPMC-sensing unit to record natural auscultations of the wrist artery. The sensing capabilities are validated by characterizing the same through periodic impact loading over the polymer surface. The composite is installed on 10 healthy individuals, while the generated pulse-tracks are recorded simultaneously using a configured digital stethoscope used as reference. The experiments conducted on the selected experimental-set, in diverse physiological states reveal the potency of the proposed scheme in offering a novel material alternate to prevalent practices in pulse-bit sensing. The marked simplicity paves way for its induction as a potential smart sensor interface for pulse-rate monitoring.

1. Introduction

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