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Abstract

Flexible Piezoelectric Thin Films for Podiatric Sensors with Wireless Communication [†]

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Abstract: For reasons of availability and cost, patients are sent home increasingly early, with limited follow-up due to the complexity and size of medical devices. In this context, researchers from IETR and MIPS laboratories are working on a device which should monitor the progress of a patient, in order to detect early the aggravation of a disease such as Chronic Obstructive Pulmonary Disease (COPD) or diabetes with walking disorders. The device is based on flexible piezoelectric thin films (3 µm thick) that can be used as podiatric sensors and have been developed by the IETR laboratory. The originality of this work lies both in the approach to the design of the gait-monitoring device—because it was carried out directly in consultation with a doctor from the University Hospital of Nantes and a podiatrist—and in the portability of the device, which should eventually allow the follow-up of a patient at home. For this study, the flexible piezoelectric sensors have been elaborated using a Chemical Solution Deposition (CSD) process and a commercial aluminum (Al) foil as substrate. In order to increase the flexibility of sensors and to aid its insertion in a shoe, piezoelectric films have been encapsulated by lamination into polyethylene terephthalate (PET, 150 µm). In this paper, the elaboration and characterization of flexible piezoelectric sensors, analog-to-digital converter and wireless communication protocol used for data transmission are presented.

Keywords: podiatric sensors; piezoelectric thin films; wireless communication



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Supplementary Materials: The presentation file is available at <https://www.mdpi.com/article/10.3390/I3S2021Dresden-10127/s1>.