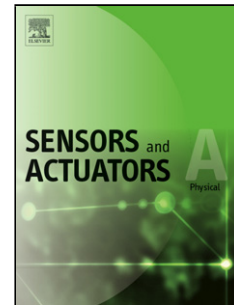


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1 Wheat gluten, a bio-polymer layer to monitor relative
2 humidity in food packaging: electric and dielectric
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12 **Abstract:** Thin wheat gluten protein film, largely investigated as eco-friendly material for
13 food packaging, is investigated as a relative humidity monitoring polymer deposited on
14 designed and manufactured interdigital capacitor (IDC) systems, on the frequency range from
15 30 MHz to 1000 MHz. The ability of wheat gluten to interact with water molecules was
16 characterized and assessed in terms of electrical and dielectric properties with the IDC
17 technique. When relative humidity increases from 20% to 95% RH at 25°C, the dielectric
18 permittivity and loss change from 5.01 ± 0.04 to 9.79 ± 0.06 and from 0.39 ± 0.01 to 1.48 ± 0.02
19 respectively. The dielectric permittivity and loss are very sensitive to relative humidity and
20 increase exponentially due to the comparable exponential increase of wheat gluten water
21 content versus relative humidity. The accessibility of water molecules and the plasticization of

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