

Terahertz dielectric sensor based on novel meta-atom cluster

ABSTRACT

In this paper, we report meta-atom sensor based on planar hexagon split ring resonators. The sub-wavelength structure is designed to operate in terahertz frequency band. A modified version of split ring resonator geometry is simulated for sensing dielectric changes by placing thin dielectric layers as sample materials on the full frontal surface of sensor. The effective parameters are retrieved using Nicolson-Ross and Weir method. The meta-atom sensor shows significant changes in resonant frequency as a function of transmission (magnitude of S21 parameter) response, which was observed when the sensor is loaded with the dry layer of dielectric materials of different dielectric constants. This paper contributes new shape of meta-atom structure used as a terahertz dielectric sensor. The proposed sensor can be used in multitudinous terahertz near field sensing applications.

Keyword: Dielectric sensor; Meta-atom; Near field; Split ring resonator; Terahertz