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Author

Grant J. Shi X. Alton J. Cumming DRS.

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Grant J.; Shi X.; Alton J.; Cumming D. R. S.

Author/Editor Affiliation

Grant J. Shi X. Cumming DRS. : Department of Electronics and Electrical Engineering, University of Glasgow, Glasgow G12 8LT, UK

Alton J. : Teraview Ltd., Platinum Building, St John's Innovation Park, Cowley Road, Cambridge CB4 0WS, UK

Title

Terahertz localized surface plasmon resonance of periodic silicon microring arrays

Source

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Abstract

We demonstrate the absorption characteristics of silicon microring resonators at terahertz frequencies. Simulation and experimental data show a dipolar localized surface plasmon resonance (DLSPR) absorption peak. We demonstrate that the frequency position and magnitude of the DLSPR peak may be tuned by varying the geometry and thickness of the microring or by modification of the silicon impurity concentration. Finite difference time domain simulations reveal that there is a strong enhancement of the electric field at the resonant frequency. The absorption properties of our resonator are described in terms of effective optical constants and reveal that the silicon microring is an electric resonator. Surface plasmon resonators are efficient terahertz absorbers and have potential applications in security imaging, biological analysis, spectroscopy and nondestructive testing. (20 References).