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Terahertz nanogap antenna detection of nano-bridges and nano-rods H.R. PARK, M.A. SEO, J.S. KYOUNG, S.M. KOO, Seoul National University, O.K. SUWAL, S.S. CHOI, Sunmoon University, N.K. PARK, D.S. KIM[1], Seoul National University, CENTER FOR SUBWAVELENGTH OPTICS TEAM — We have measured transmission properties of a composite structure consisting of nano-rods on a long (a_y=300 micron) nano gap (70 nm) on Au film in broad frequency range of 0.1 THz to 1.0 THz using THz time-domain spectroscopy. The normalized transmittance with no nano-bridge or nanorod structure in the middle shows a half-wavelength resonance: the resonance frequency is $\sim c/(2na_y)$ where n is the index of refraction of the substrate. The nano-size bridge at the center of the nano gap gives changes the resonance characteristics profoundly, because in essence, the length a_y now halves. Mostly the same resonance-changing behavior is expected with a nano rod structure fabricated by Pt-deposition method using a focused ion beam (FIB). This small rod also acts as a bridge dividing the length of the rectangle. We also positioned nano-rods to lie at one third of each nano gap, dividing the length by the ratio of 1: 2. A resonance peak shift was observed. The structure dependent resonance allows to detect nano-size particles and to tailor resonance characteristics with feature sizes of $\lambda/10{,}000$.

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