Antenna array enhanced attenuated total reflection IR analysis in aqueous solution

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S1. Water induced antenna resonance shift on Si and Al$_2$O$_3$

Figure S1. Simulated resonance spectra of the antenna arrays on Si (a) and Al$_2$O$_3$ prisms (b) in air and water with p-polarization, respectively.
S2. Details of simulations

Figure S2. Scheme of the numerical models used in simulations. The simulation parameter of incident angle ($\theta=70^\circ$) in ATR mode is the same as in experiments. (a) The incident light polarization ($E$) is in the incident plane (p-polarization, -p). (b) $E$ is in the incident plane perpendicular to the incident plane (s-polarization, -s). (c) $E$ polarization in (a) is 30° or 90° rotated as indicated (-p, R). (d) $E$ polarization in (b) is 30° or 90° rotated as indicated (-s, R).

In the present study, numerical simulations are performed using a commercial finite element method (FEM)-based software package (COMSOL Multiphysics). The refractive index of Si prism and water is taken as 3.4 and 1.33, respectively. The permittivity of gold is described by a Lorenz-Drude model. Periodic boundary conditions are applied to the four faces (parallel to the propagation direction) of a simulation domain, mimicking the antenna array shown in Figure 2(c).

Reference