Supporting Information

for

Molybdenum Oxide Functional Passivation of Aluminum Dimers for Enhancing Optical-Field and Environmental Stability

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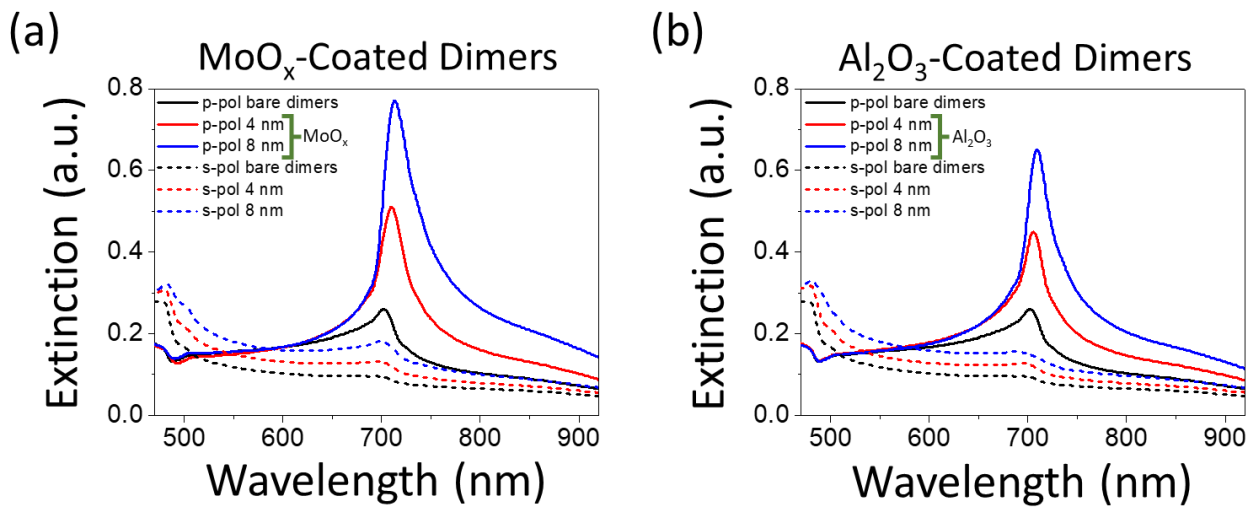

Figure S1. Simulated extinction spectra for Al dimers by progressively increasing the (**a**) MoO_x and (**b**) Al_2O_3 coatings on bared Al nanostructures (Al core/native Al_2O_3 shell dimers) up to 4 and 8 nm thick dielectric films, for s-pol and p-pol polarized excitation.

Figure S1 demonstrates the beneficial role of the dielectric coating, which provides an enhanced optical extinction, for longitudinal polarized excitation, by increasing the oxide thickness. Such an increase in the extinction is larger for high refractive index oxide coating as MoO_x, with respect to the Al_2O_3 film.

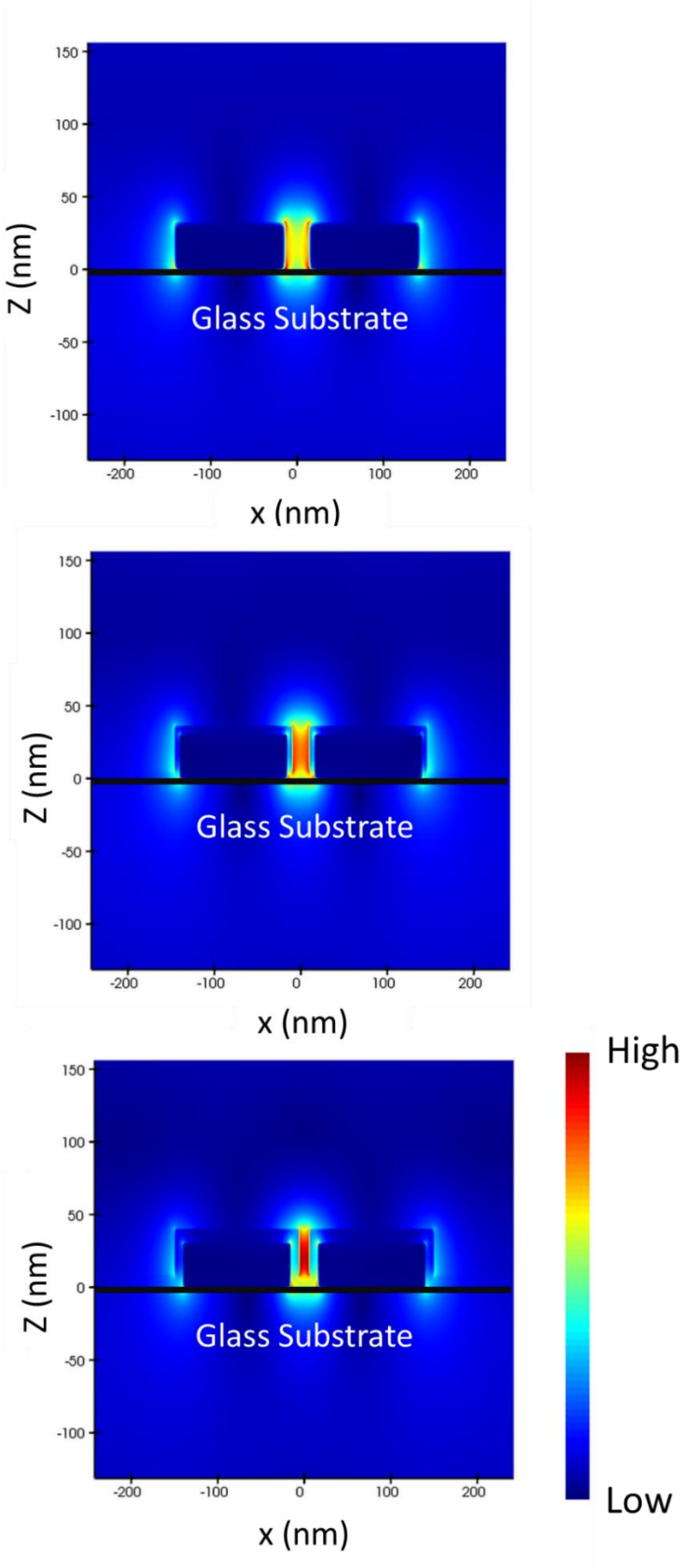

Figure S2. Calculated two-dimensional near-field enhancement factor $|E/E_0|^2$ (E_0 = 1 V/m) maps (side view) for the bare (Al core/native Al_2O_3 shell dimers) and coated dimers with MoO_x layers (4 and 8 nm thick films). The maps are extracted at corresponding wavelengths of maximum extinction peaks reported in Figure 2a (right panel), and at the nanoantenna height where the EM field is maximum.

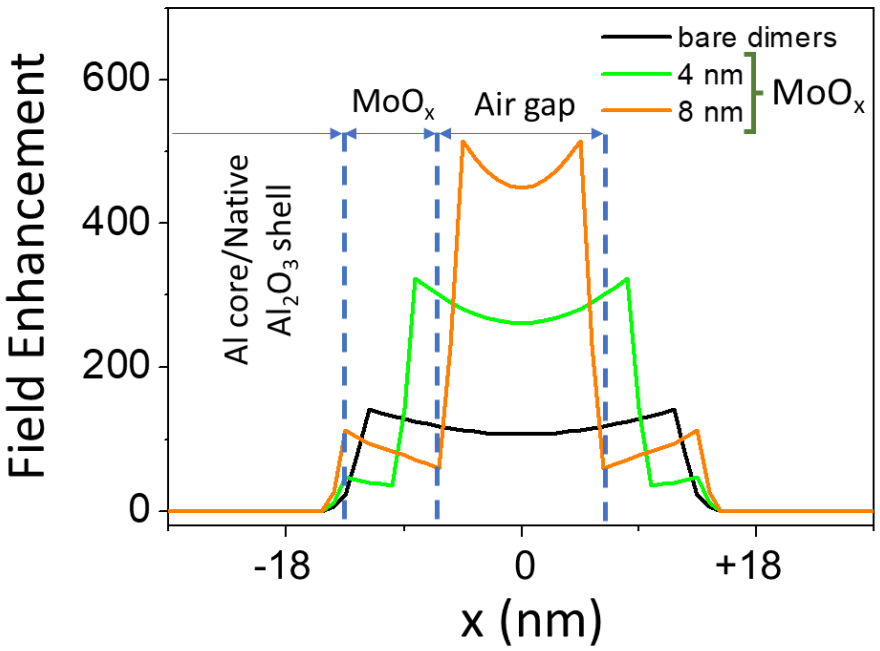

Figure S3. Simulated variations of field enhancement ($|E/E_0|^2$) values across the nanogap of the bare and coated dimers reported in Figure S2. The field enhancement was extracted at the nanoantenna height where the EM field is maximum.

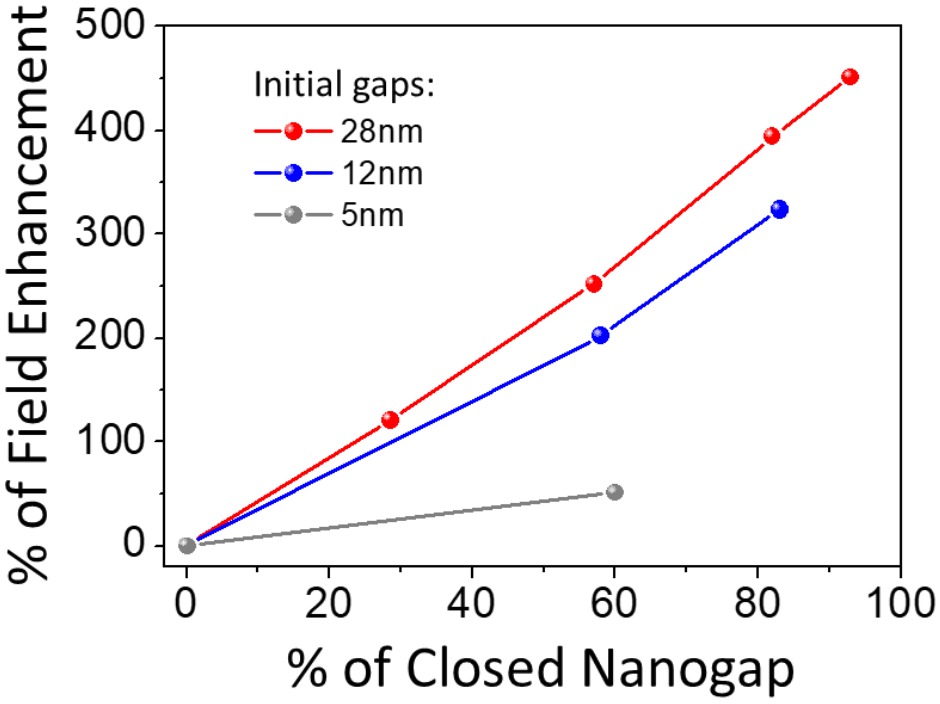

Figure S4. Percentage of EM field enhancement as function of the percentage of narrowed gap (by MoO_x ALD deposition), with respect to bare dimers for three initial nanogaps of 28, 12 and 5 nm.