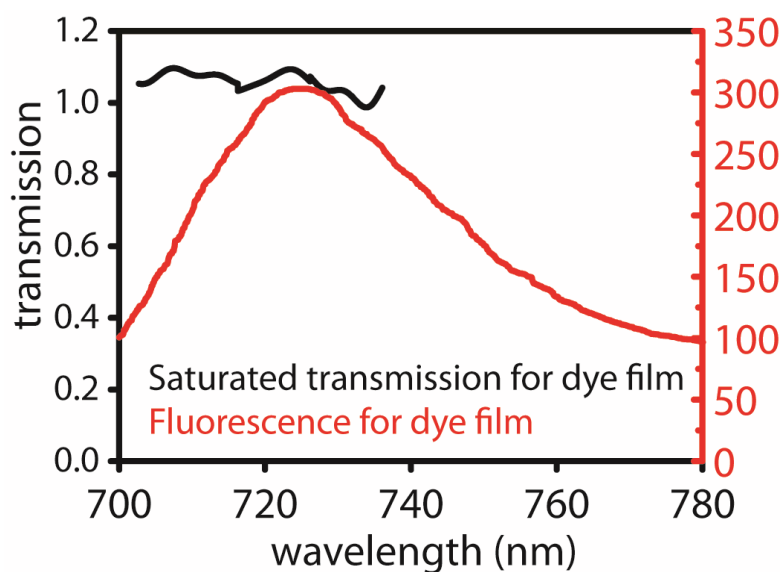
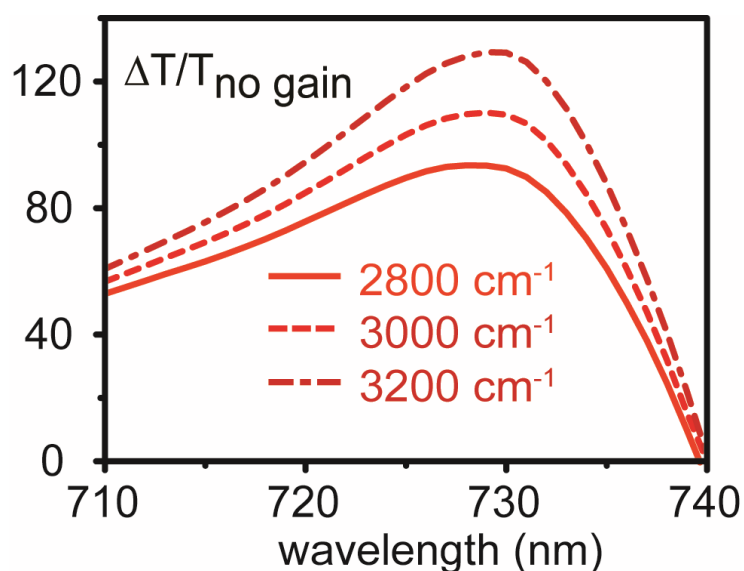


SUPPLEMENTARY INFORMATION

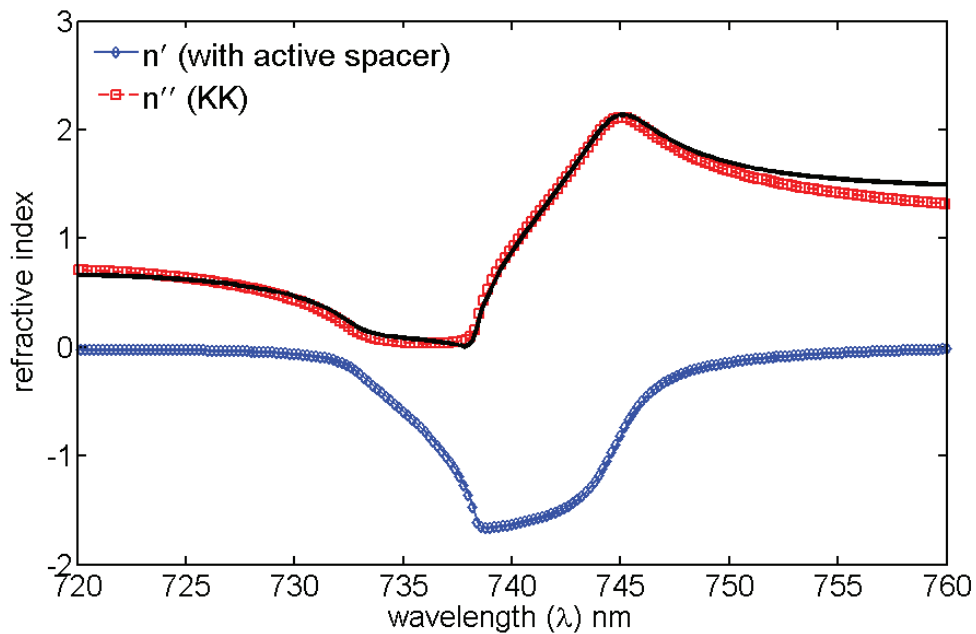


Supplementary Figure 1. The saturated transmission and fluorescence for the dye/epoxy film. As shown in the figure, the saturated gain in the small wavelength range near the plasmon resonance is rather smooth and broad.



Supplementary Figure 2. Simulation results for the relative transmission change in the sample with different effective gain coefficients. We find that the simulated

$\Delta T / T_{\text{nogain}}$ value for $g_{\text{sim}}=2800\text{cm}^{-1}$ at 725nm matches the experimental value near the resonance.



Supplementary Figure 3. Comparison of numerically retrieved results for the imaginary part of the effective refractive index (n''). The n'' obtained with the truncated K-K numerical convolution (red line with squares) and the n'' retrieved with our general scheme (black line) show qualitatively and quantitatively similar results.