

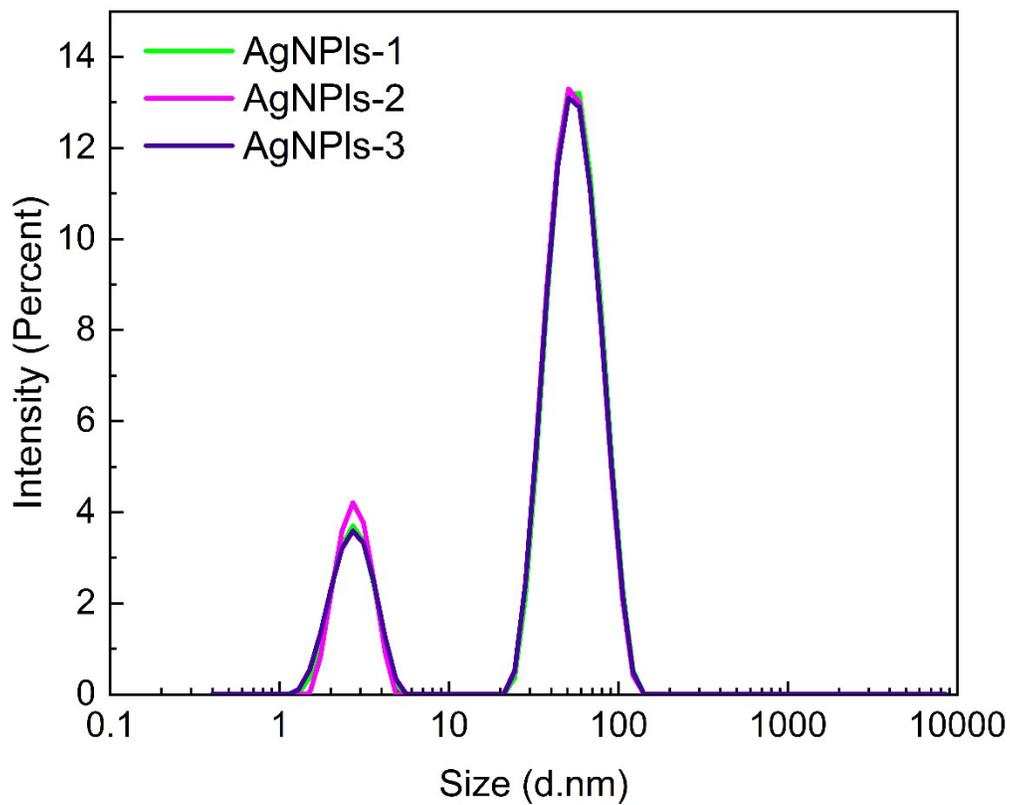
**[Supplementary Information]**

**Lysozyme-sensitive plasmonic hydrogel nanocomposite  
for colorimetric dry-eye inflammation biosensing**

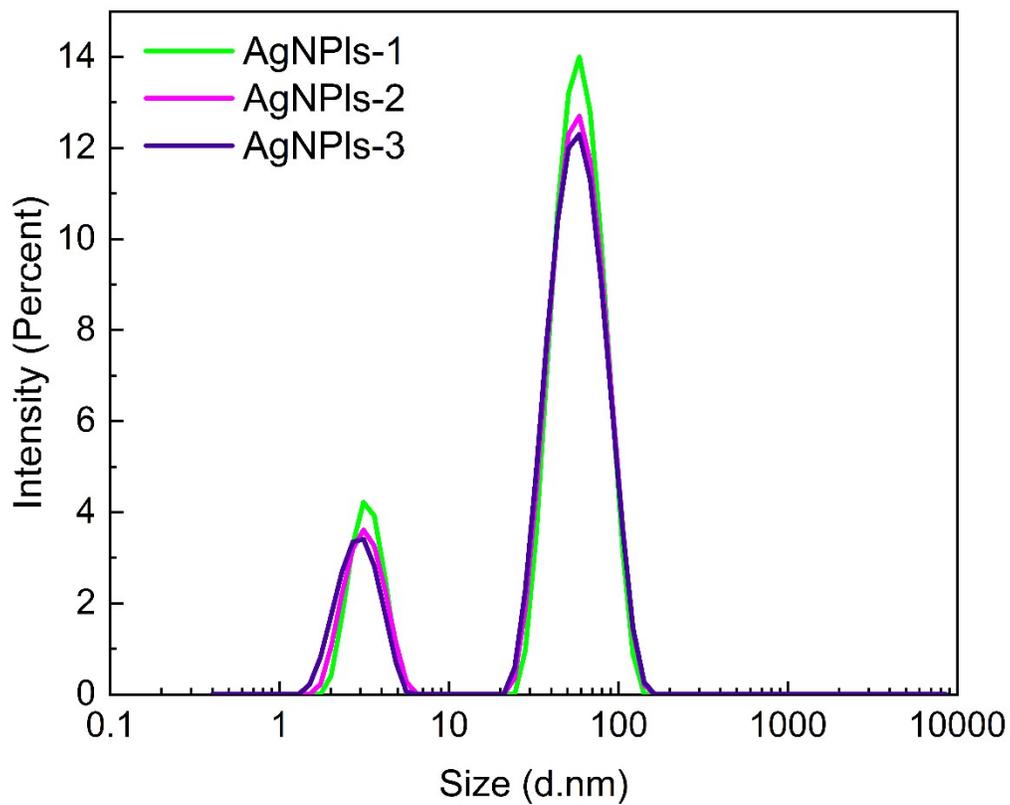
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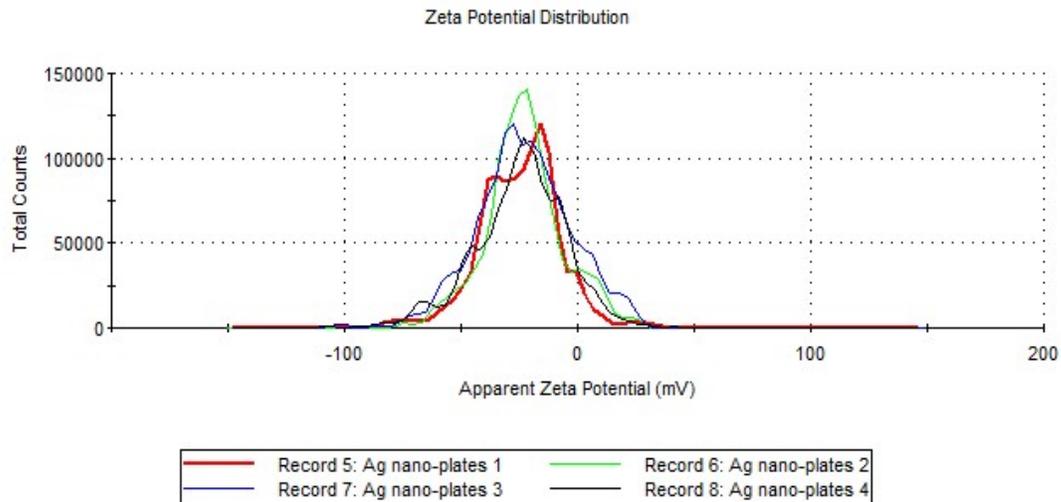
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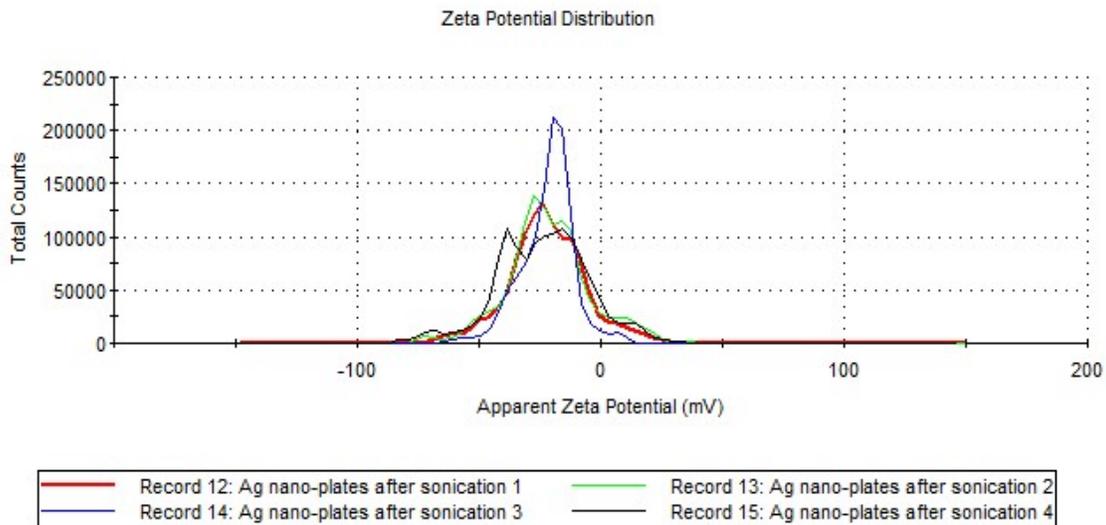
**Figure S1.** DLS measurements of the AgNPIs showing their average size before sonication (average size of  $57.2 \pm 0.53$  nm).



**Figure S2.** DLS measurements of the AgNPIS displaying their average size after sonication (average size of  $60.89 \pm 0.31$  nm), which proves the nanoparticles' stability will not change before and after the sonication.



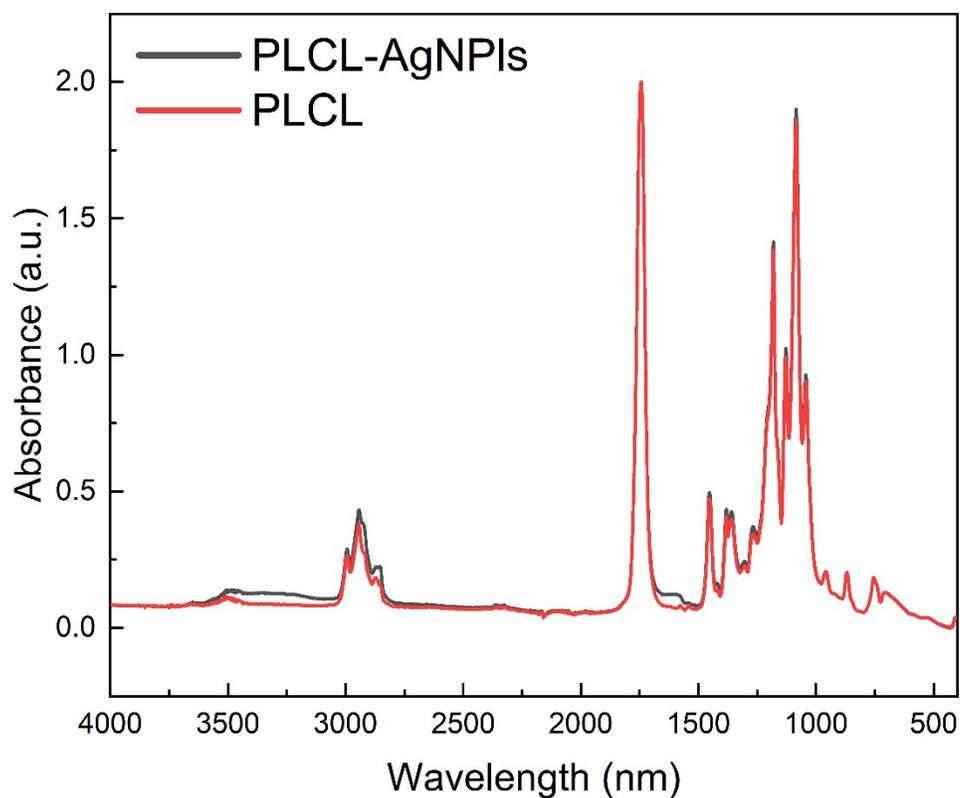
**Figure S3.** Zeta potential measurements showing the average surface charge of  $-23.85 \pm 1.10$  mV for AgNPIs before sonication, which proves the nanoparticles' stability without the need of sonication.



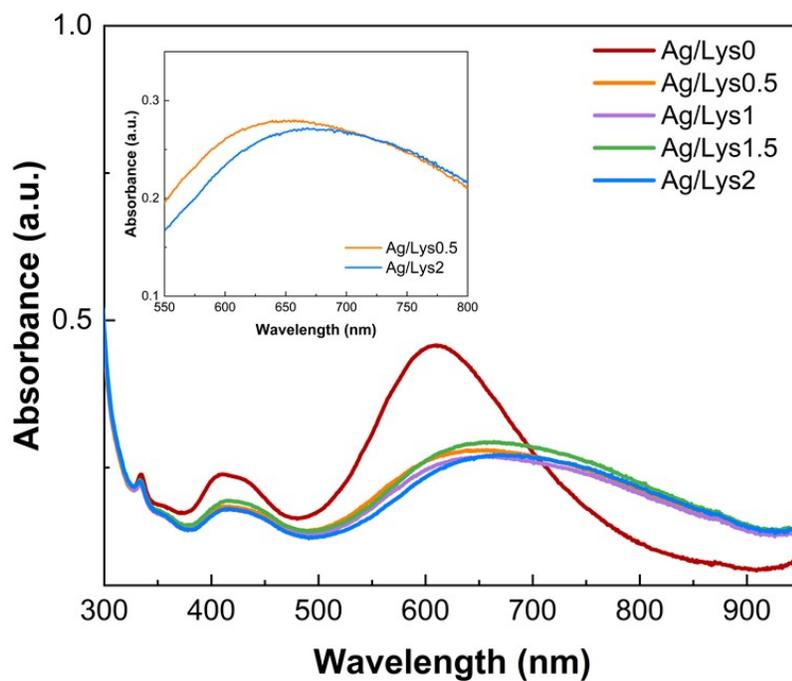
**Figure S4.** Zeta potential measurements of the AgNPIS after sonication show their average surface charge of  $-22.3 \pm 1.00$  mV, proving the nanoparticles' stability before and after the sonication.

**Table S1.** Average nanoparticle size and their distribution using DLS and nanoparticles surface charge using zeta potential methods before and after sonication, showing the stability and uniformity of the nanoparticles.

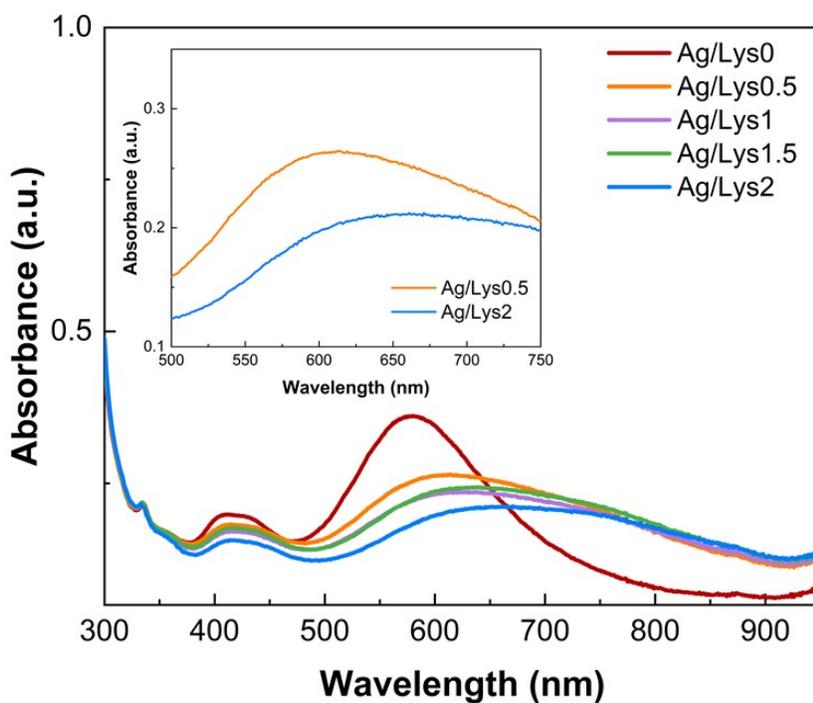
Sample	Number of repetitions	Size distribution using DLS (nm)	Zeta potential (mV)
AgNpls before sonication	4	$57.2 \pm 0.53$ nm	$-23.85 \pm 1.10$
AgNpls after sonication	4	$60.89 \pm 0.31$	$-22.3 \pm 1.00$



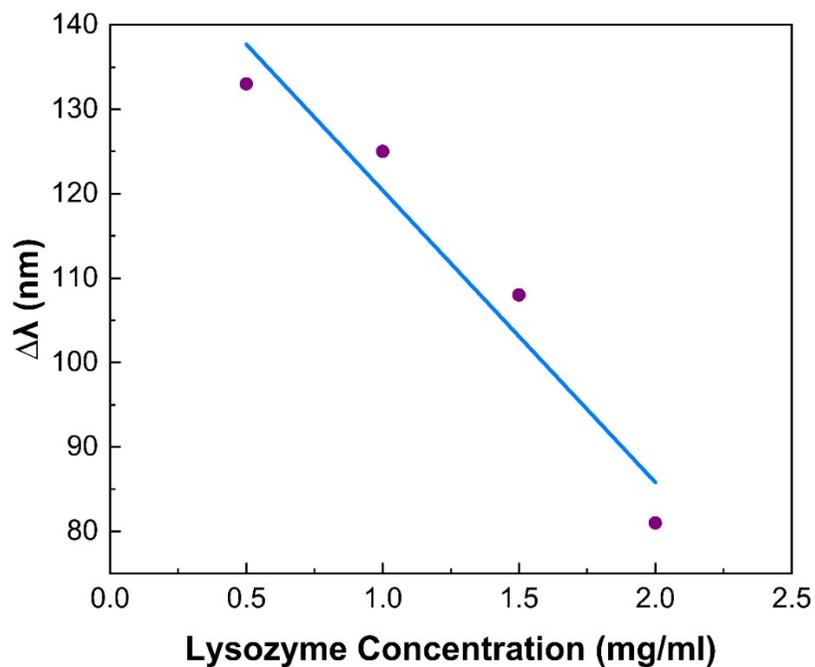
**Figure S5.** FT-IR spectrum of PLCL nanofibers before and after integrating silver nanoparticles in the system.



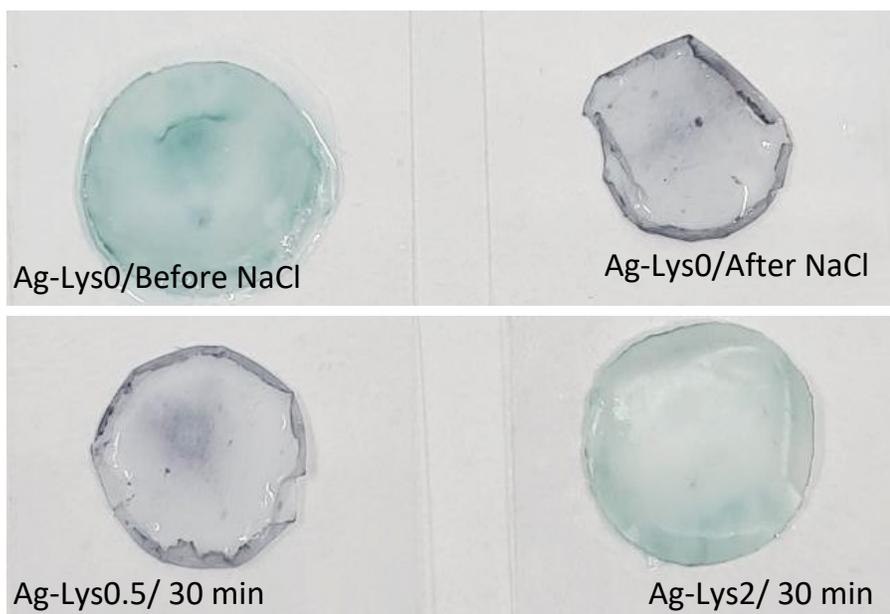
**Figure S6.** Absorbance spectra of the AgNPI sols after 10 minutes of incubation with lysozyme and NaCl.



**Figure S7.** Absorbance spectra of the AgNPIs sols after 30 minutes of incubation with lysozyme and NaCl.



**Figure S8.** Linear correlation between the changes in the lysozyme concentration and changes in the wavelength.



**Figure S9.** Photos of the color change of the samples before and after applying the lysozyme to the samples with and without NaCl. The color change for the samples in the non-healthy range of lysozyme, changing from blue to purple, confirms the potential detection by the naked eye.