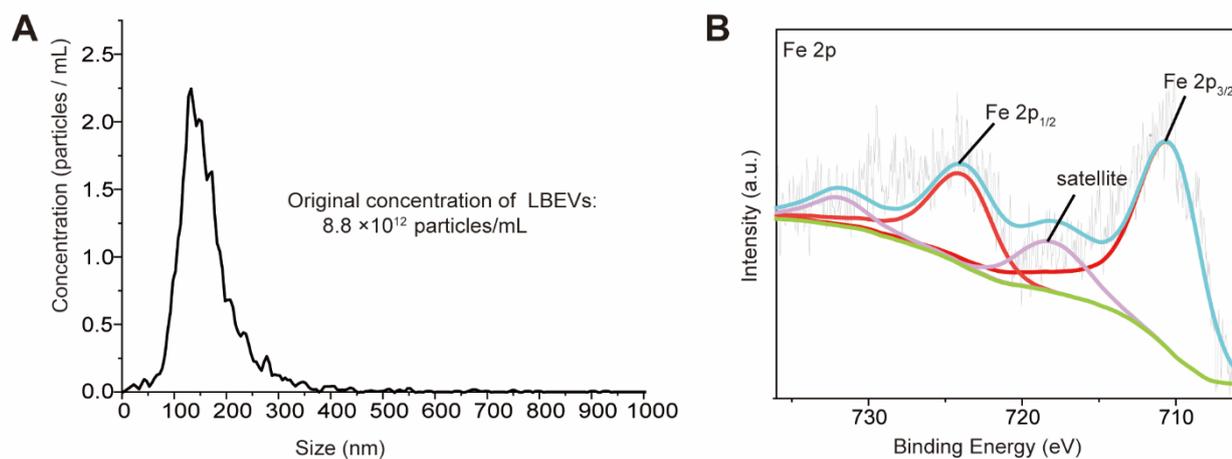


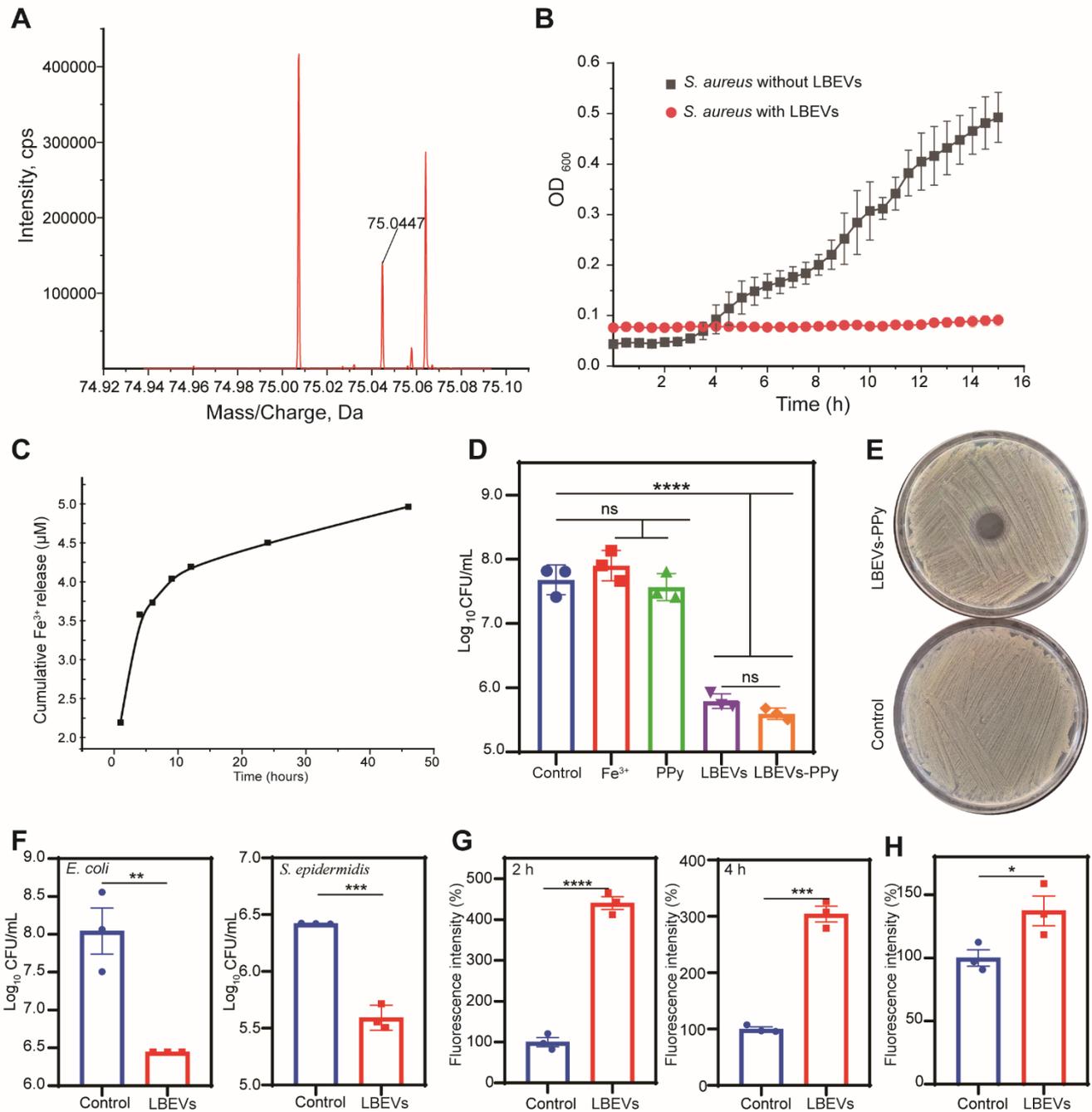
## Supporting Information

Bacterial Vesicles-Initiated *In-Situ* Spray-Polymerized Coating Enables Synergistic Antibacterial-  
Photothermal Functionality for Accelerating wound healing



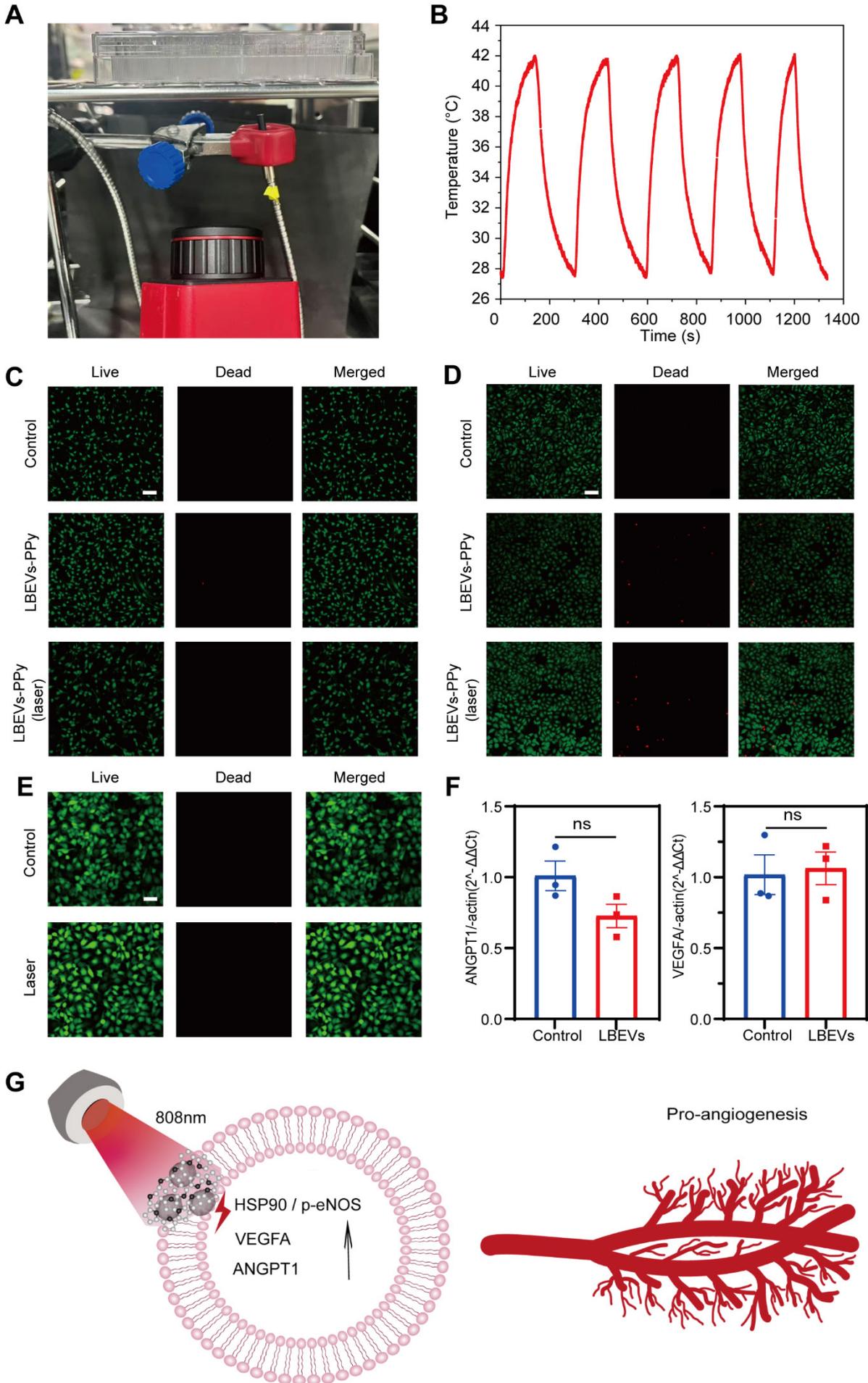
**Figure S1.** (A) NTA curve of concentrated LBEVs. (B) High-resolution XPS Fe 2p spectrum of the LBEVS-Fe<sup>3+</sup> sample.

SUPPORTING INFORMATION



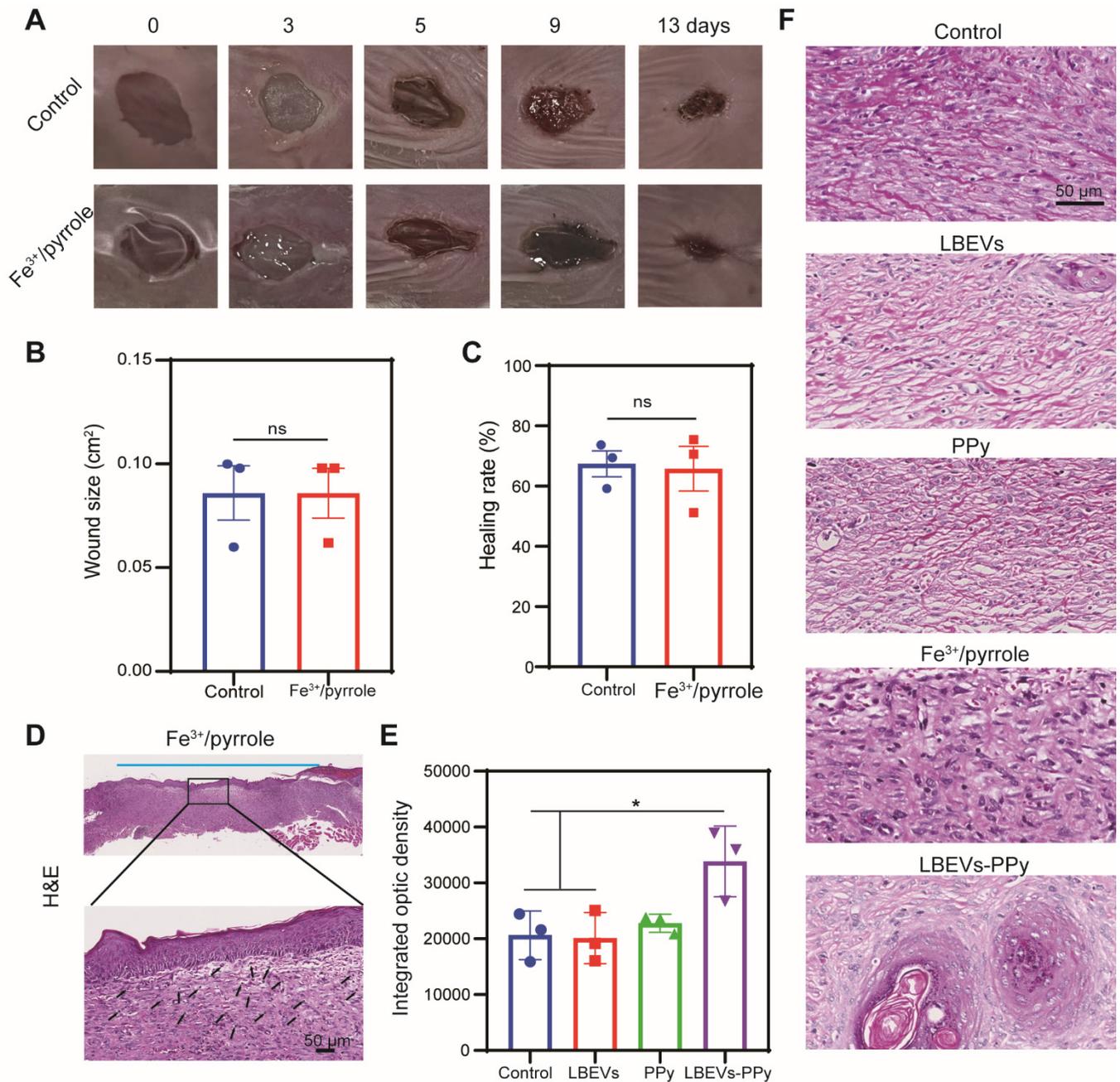
**Figure S2.** (A) Representative LC-MS plot of LBEVs. (B) Antibacterial effect of LBEVs assessed by bacterial growth curves. Growth of *S. aureus* was monitored by measuring OD<sub>600</sub> over 16 hours in TSB medium with or without the addition of LBEVs. (C) Kinetics of Fe<sup>3+</sup> release from the LBEVs-Fe<sup>3+</sup>. (D) Quantitative comparison of the antibacterial efficacy of five groups (Control, Fe<sup>3+</sup>, PPy, LBEVs, and LBEVs-PPy) against *S. aureus* after 24 hours of exposure. The viable bacteria were determined by CFU counts. Data are presented as log<sub>10</sub> (CFU/mL). \*\*\**p* < 0.001, ns: no significance. (E) Qualitative assessment of the antibacterial activity of LBEVs-PPy against *S. aureus* using the agar diffusion assay method. (F) Quantitative comparison of the antibacterial efficacy of LBEVs against *E. coli* and *S. epidermidis*. (G) The ROS levels in *E. coli* after treatment with LBEVs for 2 hours and 4 hours. (H) The ROS levels in *S. aureus* after treatment with LBEVs for 4 hours.

# SUPPORTING INFORMATION



## SUPPORTING INFORMATION

**Figure S3.** (A) Schematic diagram of the experimental setup for *in vitro* photothermal performance evaluation. (B) Heating curve of LBEVs-PPy for five on/off cycles at a power density of 0.8 W/cm<sup>2</sup>. (C): Cell live/dead staining fluorescence images of NIH3T3. Scale bar: 100 μm. (D) Cell live/dead staining fluorescence images of HaCAT. Scale bar: 100 μm. (E) Representative live/dead fluorescence images of HUVECs following 808 nm, 0.8 W/cm<sup>2</sup> laser irradiation. Scale bar: 100 μm. (F) The relative mRNA expression levels of pro-angiogenic genes VEGFA and ANGPT1 in HUVECs after co-incubation with LBEVs. ns: no significance. (G) The possible mechanisms of thermal stimulation stimulates angiogenesis.



**Figure S4.** (A) Representative wound appearances in the control and Fe<sup>3+</sup>/pyrrole groups at postoperative days 0, 3, 5, 9, and 13. Quantification of (B) wound closure size and (C) wound healing rate of control and Fe<sup>3+</sup>/pyrrole groups during treatment. Ns: no significance. (D): Representative H&E staining images of wound tissues from Fe<sup>3+</sup>/pyrrole group on day 13. Scale bar: 50 μm. (E) Quantitative analysis of VEGF expression in wound tissues. \**p* < 0.05. (F): Representative high-magnification H&E staining images of wound tissues from each group. Scale bar: 50 μm.