# Supplementary Material

## Lead-free KNN-based wearable ultransonic patches for blood pressure detection

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According to equivalent circuit model, the simulated pulse-echo are shown in Supplementary Figure S1. Enter the initial piezoelectric parameters, set the target center frequency to 5 MHz, and achieve a better simulation target when the thickness of the piezoelectric layer is 0.47 mm, and the matching layer is Ag-Epoxy with a thickness of 0.096 mm.

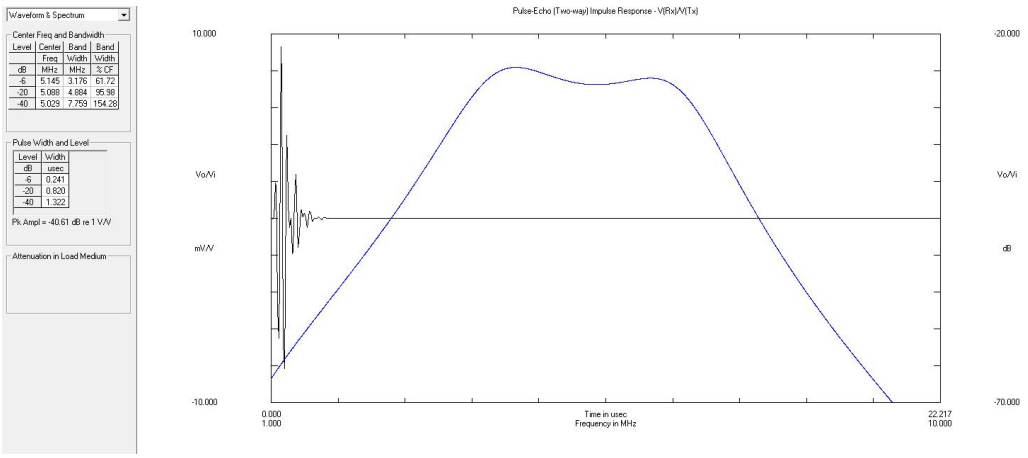


Figure S1. simulated results of pulse-echo.

Inject water into the hole through a syringe, change the aperture size, and obtain a series of pulse echo signals, as shown in Figure S2 (a)-(k), which are t=1.94 μs, t=2.11 μs, t=2.12 μs, t=2.2 μs, t=2.23 μs, t=2.38 μs, t=2.65 μs, t=2.66 μs, t=3.17 μs, t=3.63 μs, t=3.82 μs. The corresponding diameters are D=1.46 mm, D=1.58 mm, D=1.59 mm, D=1.65 mm, D=1.67 mm, D=1.79 mm, D=1.99 mm, D=2.00 mm, D=2.38 mm, D=2.72 mm, D=2.87 mm.

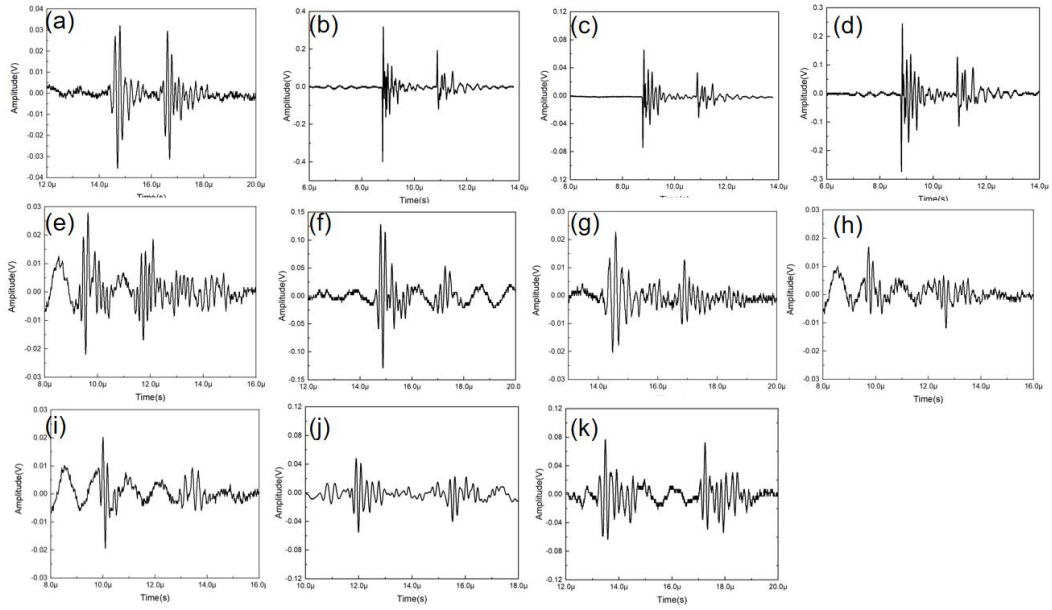



Figure S2. Results of vascular agar phantom with different apertures, from small to large.