

Supplementary material

In this study, the piezoelectric films work in 31 mode. As shown in Figure S2, 1 is the stretching direction which is also the stress direction of the piezoelectric film, and 3

is the film thickness direction which is also the direction of the generated voltage. 2 is the direction normal to 1 and 3 (Figure S3).

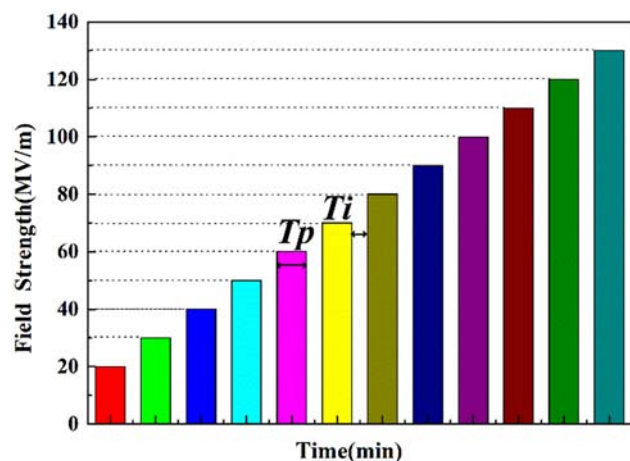


Figure S1: The relationship between the electric field and the time (operation time T_p : 8 min; pause time T_i : 4 min) during the poling process.

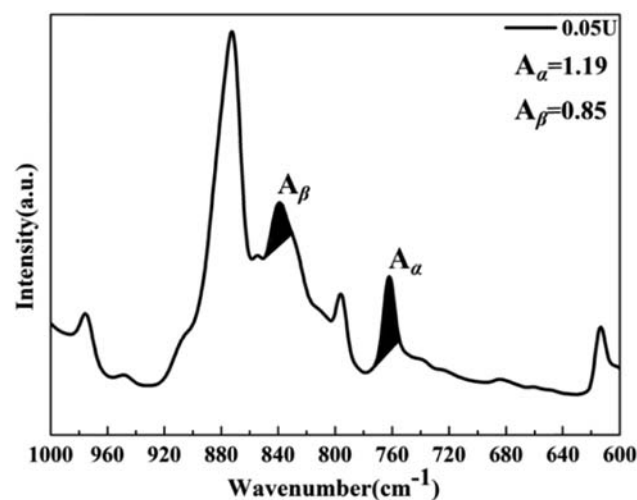


Figure S3: Calculation of the relative content of β -phase in the composite films.

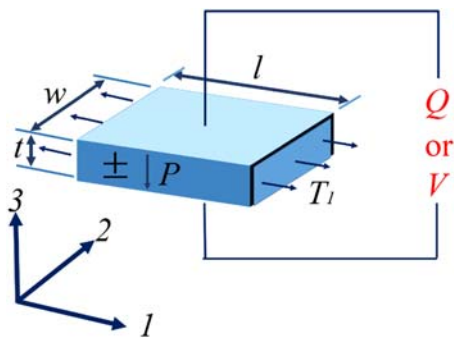


Figure S2: Directions determination of piezoelectric films.