

# Supplemental Materials

## **Giant power output in lead-free ferroelectrics by shock-induced phase transition**

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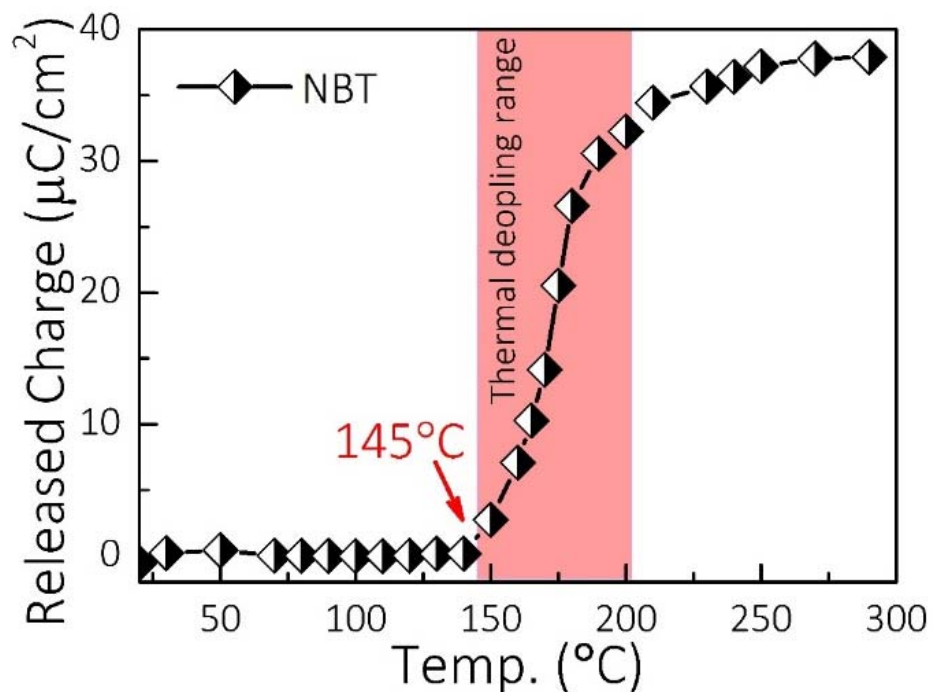
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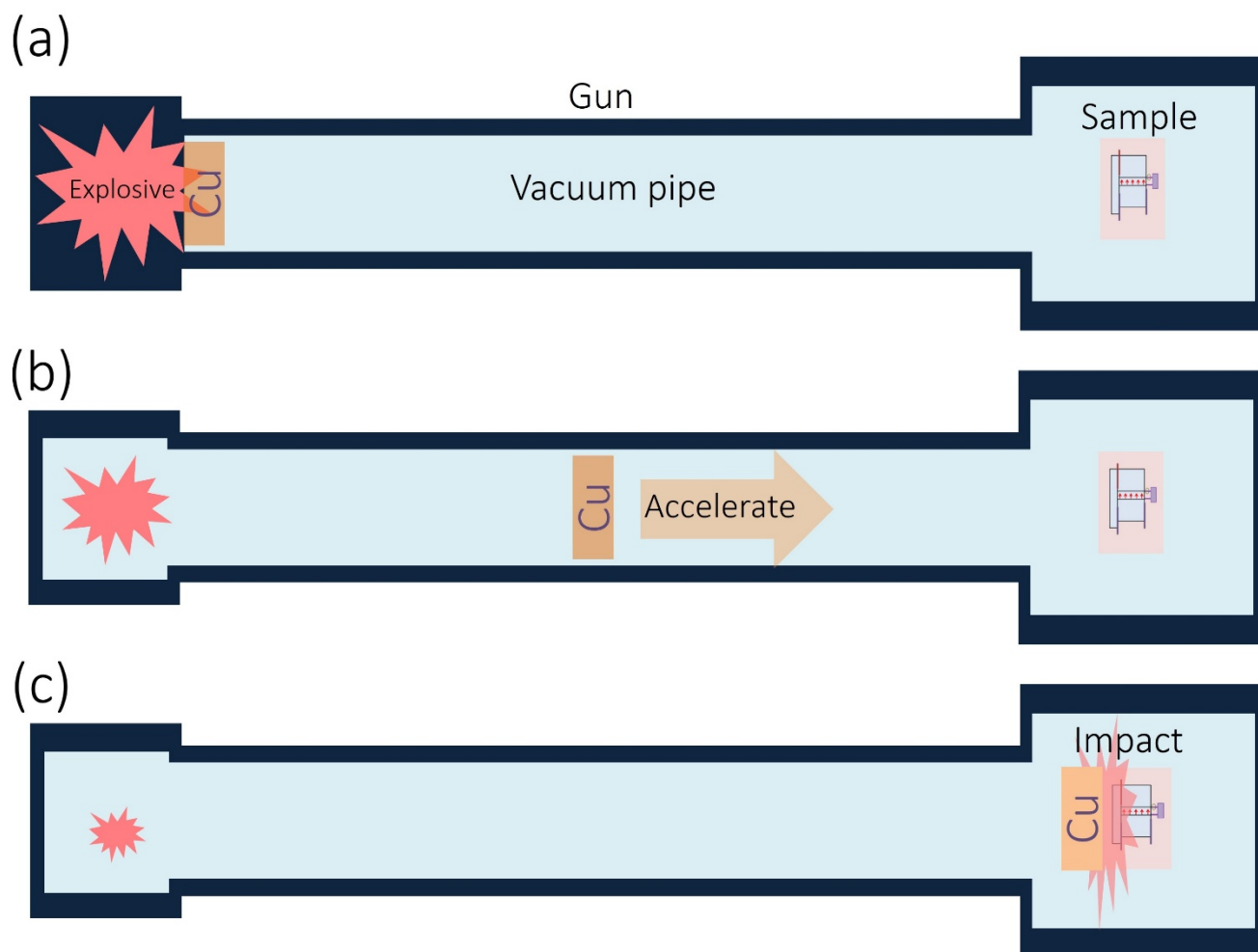
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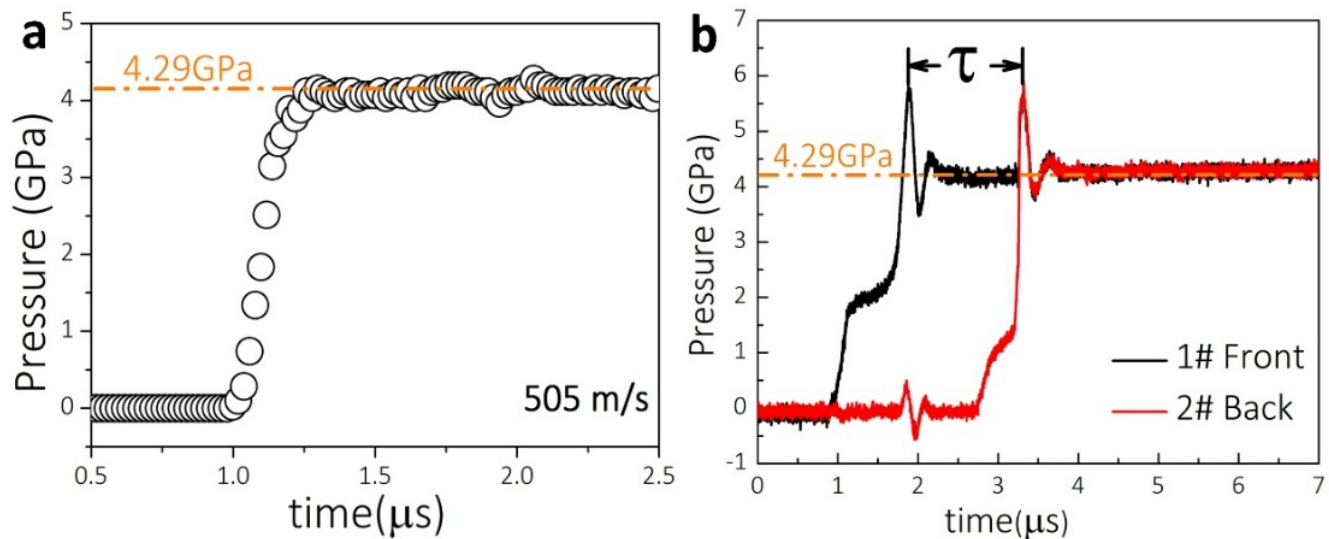
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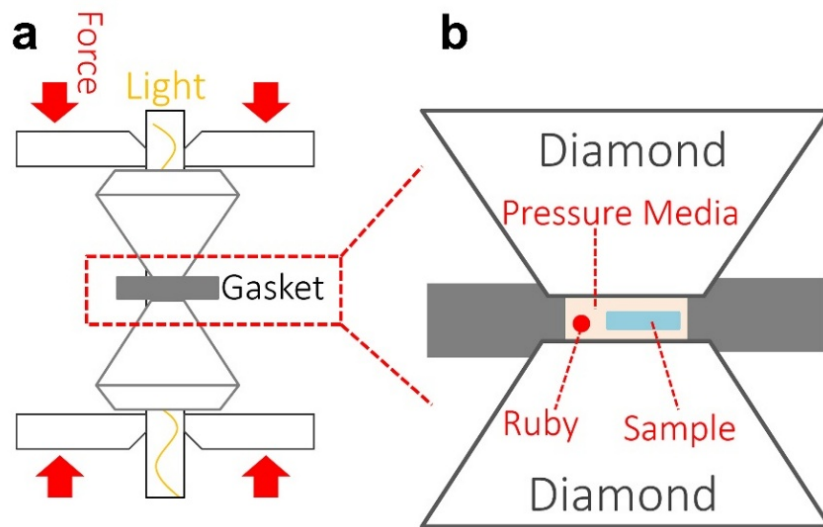
**Figure S1.** The thermal depoling behavior of the poled NBT ceramic



**Figure S2.** The schematic diagram for the dynamic experiments. (a) The copper plate was fired by explosive in a gun. (b) The copper flyer was accelerating in the gun pipe. (c) The copper plate impacted the sample and generated the shock wave.



**Figure S3.** An example (Flyer speed: 505 m/s) of the pressure measured by PVDF (a) and the signals detected by the Mn-Cu gauges under shock compression (b). The signals of Mn-Cu gauges could be used to measure the shock wave duration time and also test the pressures, which could decrease the experimental errors.



**Figure S4.** The setup of the *in situ* synchrotron powder X-ray diffraction (XRD) experiments using a diamond anvil cell (DAC) (a), and the detailed arrangement of the DAC chamber (b).

<b>Table S1. Parameters in the dynamic compressions</b>				
$P$ (GPa)	$u_p$ (mm/ $\mu$ s)	$u_s$ (mm/ $\mu$ s)	$\rho_0$ (g/cm <sup>3</sup> )	$\rho_x$ (g/cm <sup>3</sup> )
1.8	0.0835	3.58262	5.85	5.9896
2.9	0.12064	4.03836	5.85	6.03014
4.3	0.15776	4.64846	5.85	6.05551
5.7	0.18456	5.27009	5.85	6.0623
6.1	0.19225	5.42373	5.85	6.06498
6.7	0.20106	5.65371	5.85	6.06572

<b>Table S2. Lattice parameters of the structures</b>										
Rhombohedral- <i>R3c</i> ; Z=6					Orthorhobmic- <i>Pnma</i> ; Z=4					
P/GPa	a/Å	$\sigma$	c/Å	$\sigma$	a/Å	$\sigma$	b/Å	$\sigma$	c/Å	$\sigma$
0.4	5.503	0.00020	13.610	0.0008						
0.9	5.487	0.00015	13.549	0.0004						
1.5	5.471	0.00077	13.421	0.0044	<b>Phase appears</b>					
2.0	5.471	0.00116	13.419	0.0045	5.449	0.0004	5.471	0.0007	7.778	0.0003
2.1	5.457	0.00017	13.424	0.0015	5.446	0.0011	5.469	0.0009	7.781	0.0013
3.5	5.503	0.00020	13.610	0.0008	5.436	0.0004	5.459	0.0009	7.735	0.0010
4.2	<b>Phase disappears</b>				5.433	0.0011	5.457	0.0009	7.729	0.0011
5.4					5.429	0.0014	5.449	0.0013	7.708	0.0009
6.1					5.427	0.0009	5.444	0.0011	7.686	0.0009
7.6					5.425	0.0012	5.433	0.0014	7.652	0.0008
9.1					5.420	0.0013	5.424	0.0013	7.635	0.0009