Supporting Information

Preparation of Nanoscale Homogeneous Energetic LeadAzides@PorousCabon Hybrid with High Ignition Ability by *In-situ* Synthesis

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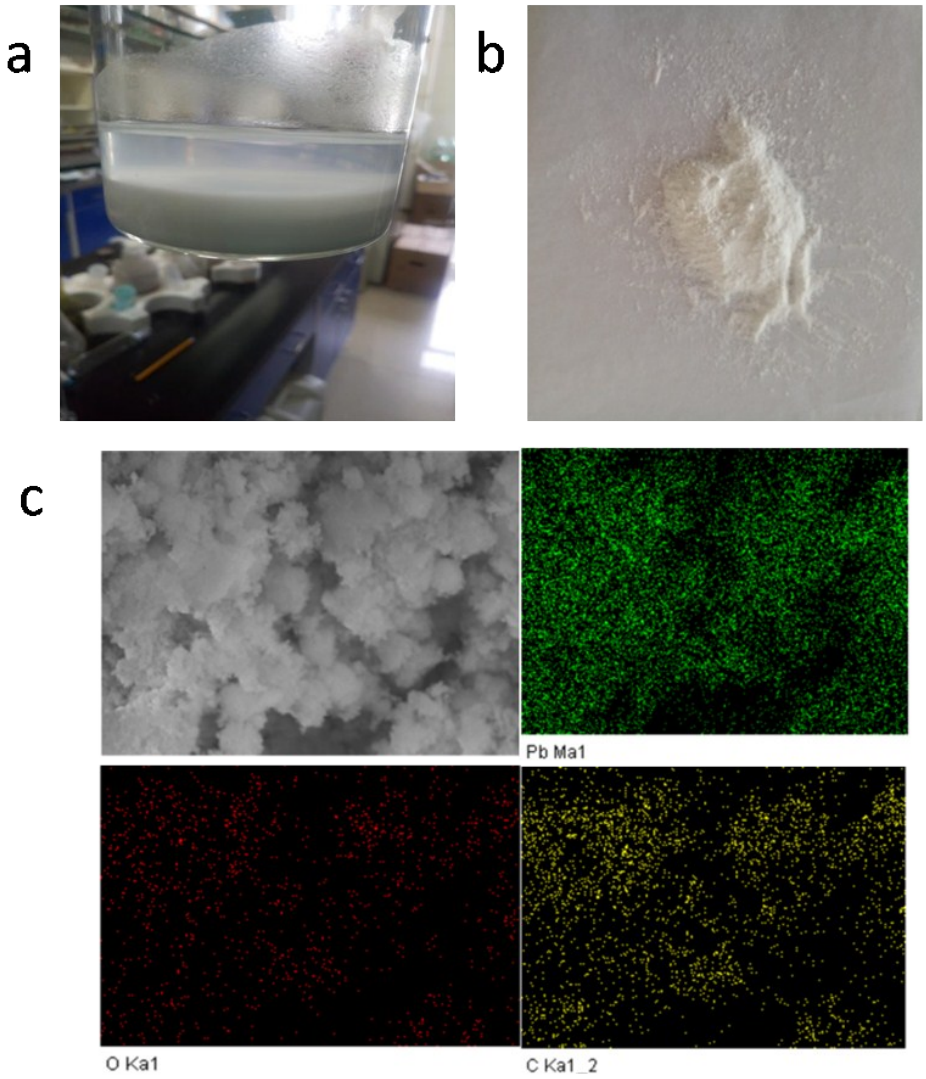

Figure S1. a) Two-phase separation of PAA-Pb gel after healing; b) PAA-Pb freeze-dried gel powder; c) SEM Morphology and Mapping Diagram of PAA-Pb.

It can be seen from the figure S1 b that the gel after freeze-drying is a white powder with good dispersibility, certain adhesion, uniform chemical composition, fine particles and high purity. The energy dispersive X-ray spectroscopy (EDS) mapping (Figure S1 c) for C, O, Pb elements, respectively, reveals the uniform distributed C, O and Pb elements over the whole surface of PAA-Pb.

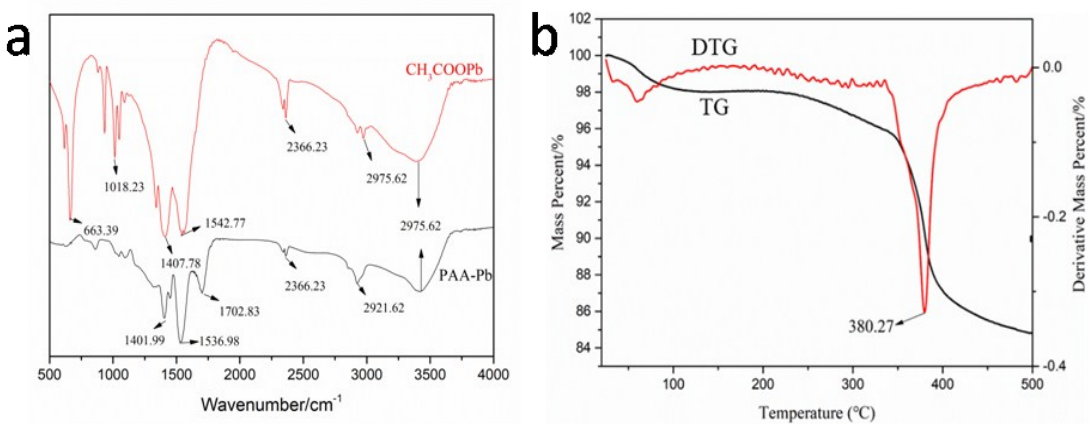

Figure S2. a)Infrared spectra of $(CH_3COO)_2Pb$ and PAA-Pb; b)TG and DTG curves of PAA-Pb.

By analyzing the FT-IR data of the gel dry powder, from the figure S2a , the peak position of the symmetric stretching of the carboxyl group C=O is basically maintained at about 1550 cm^{-1}. the split of the C=O anti-symmetric stretching peak disappears, the crack at 1401 cm^{-1}, and the presence of the C=O stretching peak at 1702 cm^{-1} proved that the binding of Pb^{2+} to the $-COO^-$ group on the polymer chain completed the crosslinking reaction.

The results of TG (the figure S2b) showed that the thermal decomposition process of the gel was mainly divided into two parts: dehydration and decarboxylation. At about 380.27 °C, it represented the process of decarboxylation and the weight loss rate was the fastest. When the temperature reached 500 °C, the thermal decomposition process of the glue has not been completed.

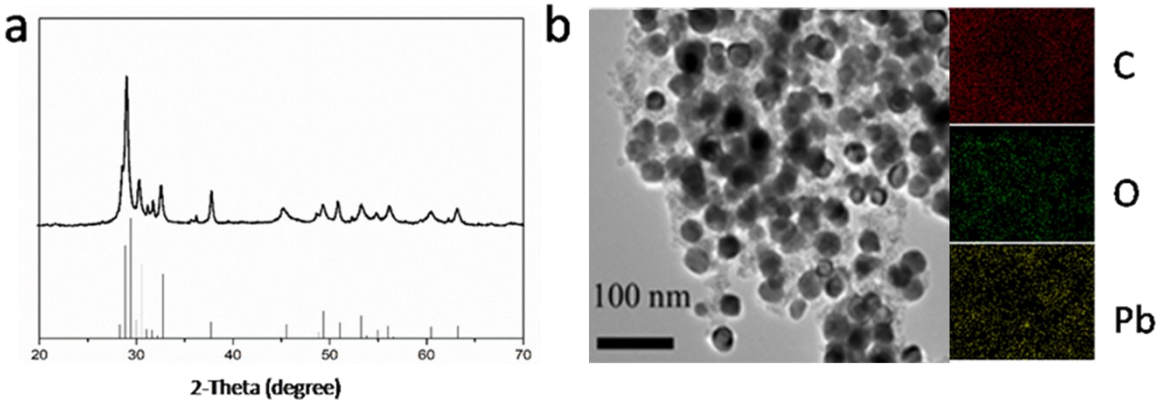

Figure S3. a) Comparison of XRD standard curve of carbonized product and lead oxide (JCPDS card No. 38-1477); b) transmission electron microscope (TEM) and EDS mapping.

In the PXRD analysis (Figure S3 a), the typical PbO patterns emerged in the PbO@PC complex, and no other impurity peaks are shown. The energy dispersive X-ray spectroscopy (EDS) mapping (Figure S3 b) for C, O, Pb elements, respectively, reveals the uniform distributed C, O and Pb elements over the whole surface of PbO@PC.

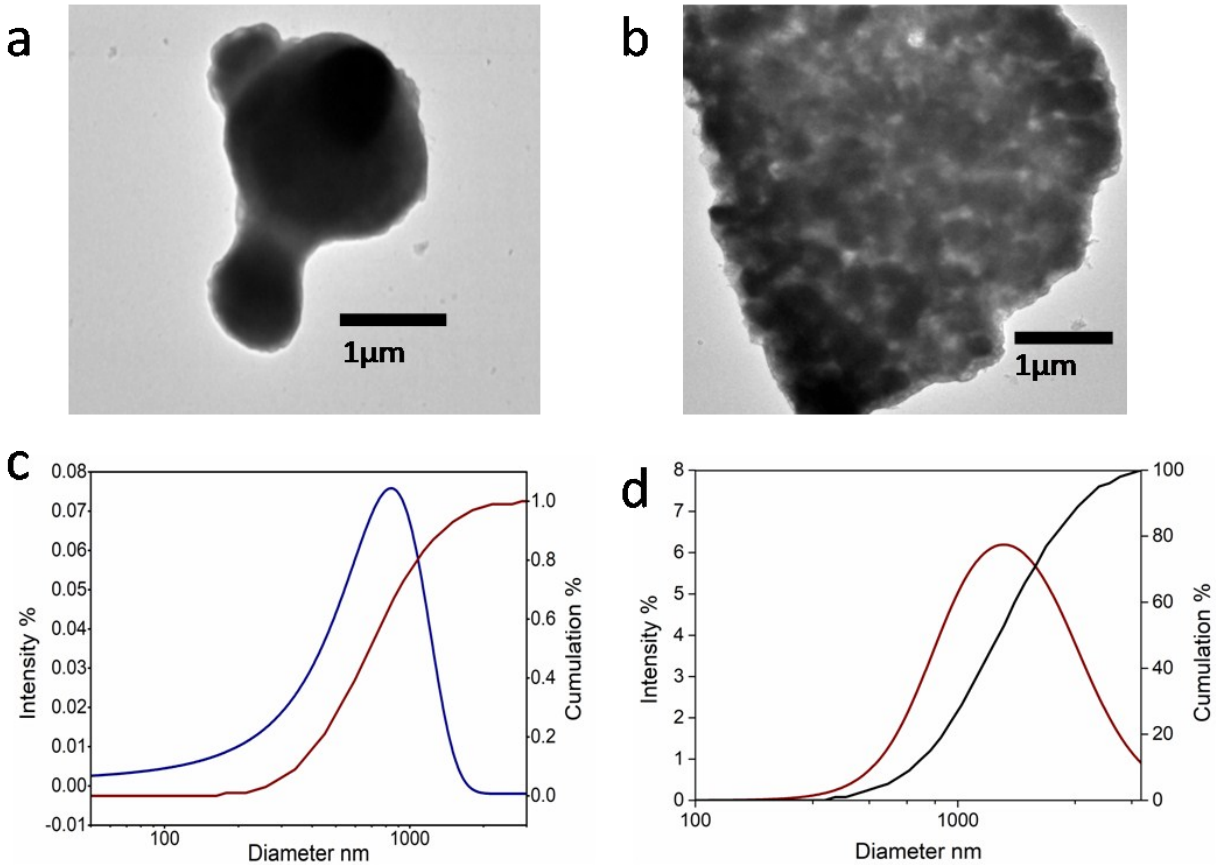

Figure S4. a) TEM image of $(CH_3COO)_2Pb$ thermal decomposition products under air atmosphere; b) TEM image of PAA-Pb thermal decomposition products under air atmosphere; c) and d) Particle size distribution of $(CH_3COO)_2Pb$ and PAA-Pb thermal decomposition products.

The thermal decomposition products of $(CH_3COO)_2Pb$ and PAA-Pb in air atmosphere are agglomerated large particles, which are not suitable as intermediates for subsequent azidation reaction.

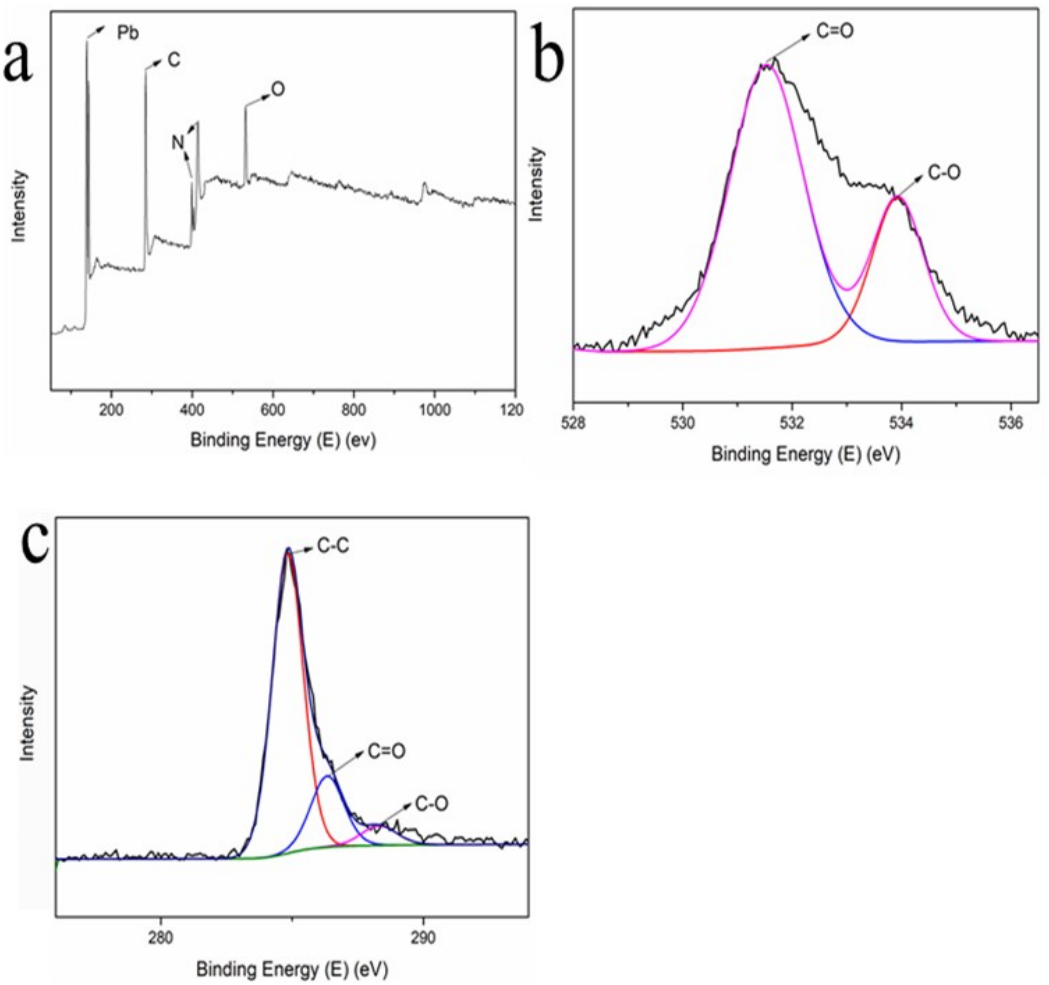

Figure S5. a) XPS total spectrum of LA@PC； b) and c) XPS spectra (O and C) curves of LA@PC.

The XPS results of LA@PC are shown in the following Figure S4. The total spectrum shows the presence of four elements: C, O, N, and Pb. From the spectrum of O, C=O, and C-O are observed. From the spectra of C, C-C, C=O, and C-O can be found, which are corresponding to the spectrum of O.

Figure S6. Sample map of LA@PC.