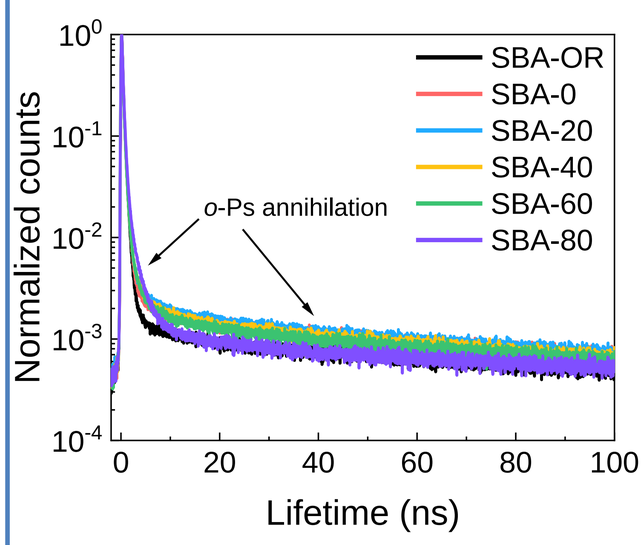
Positron annihilation study of dielectric polymer-nanocluster composites and amino-functionalized mesoporous silica

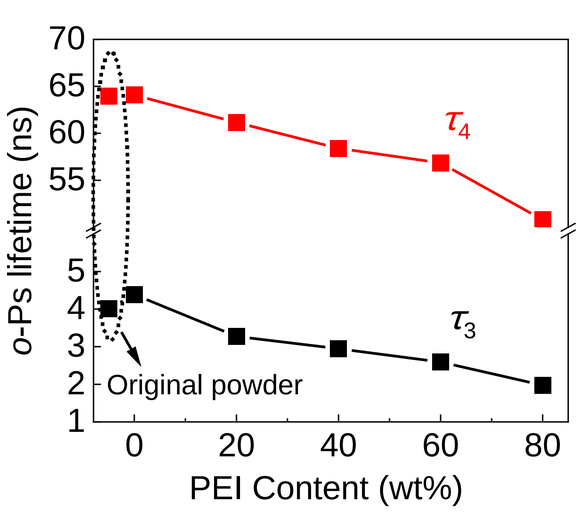
R.S. Yu[1],*, T. Song[1,2], P. Zhang, P. Kuang, X.Z. Cao and B.Y. Wang

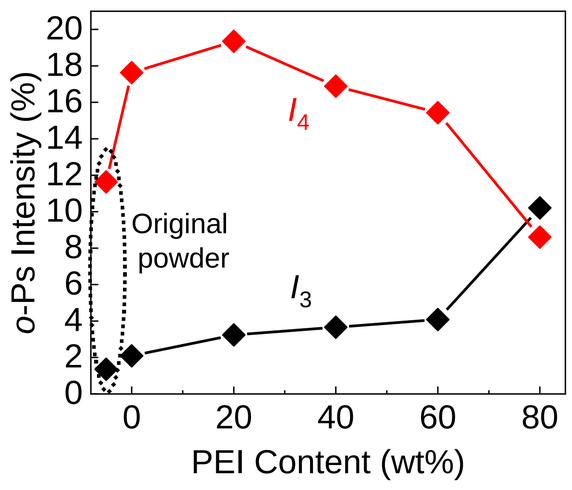
1.Multi-diInstitute of High Energy Physics, Chinese Academy of Sciences, Beijing 100049, China

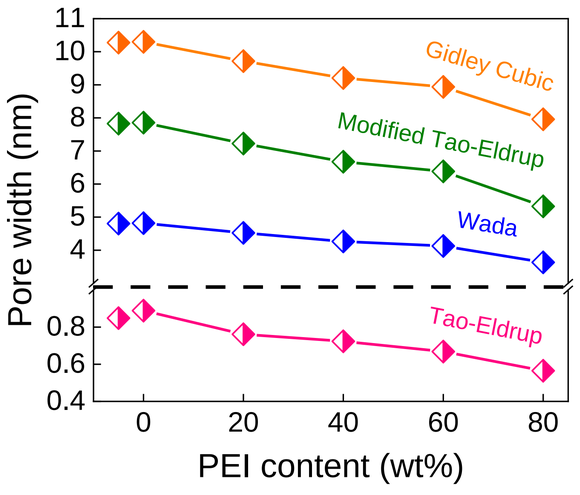
2.School of materials and chemistry, China University of Geosciences, Wuhan 430072, China

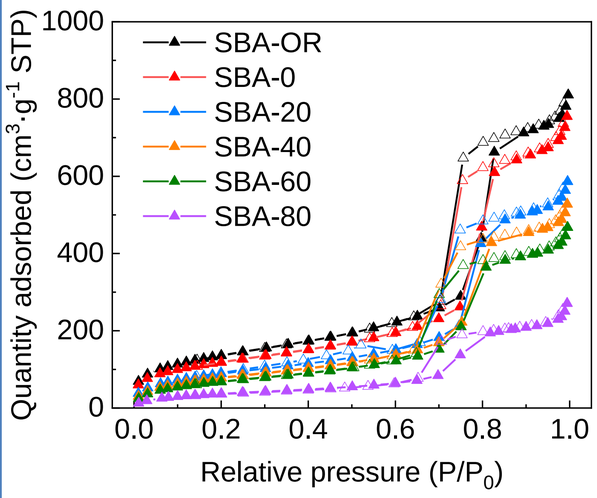
Positron annihilation spectroscopy was afford to study free volume properties of polyetherimide (PEI) polymer with ultra-low concentration of nanoparticles (0-0.5 vol.% AlN and C60 molecules) filling, the polymer dielectric constant was found somewhat in positive correlation with polymer free volume sizes. Further modification of the polymer structure via $C_{60}(OH)_x$POTs is under study. Secondly, mesoporous SBA-15 impregnated by polyethylenimine (0-80% wt%) reveals maximum carbon dioxide adsorption ability of 2.2 mmolg-1, and finally, relationship between meso-pore architecture of amino-functionalized SBA-15 and Ps annihilation long lifetimes are to be discussed with colleagues at PPC-12.5.

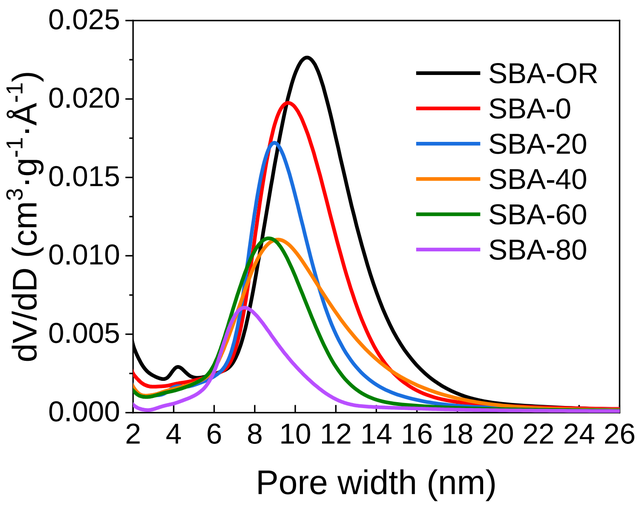


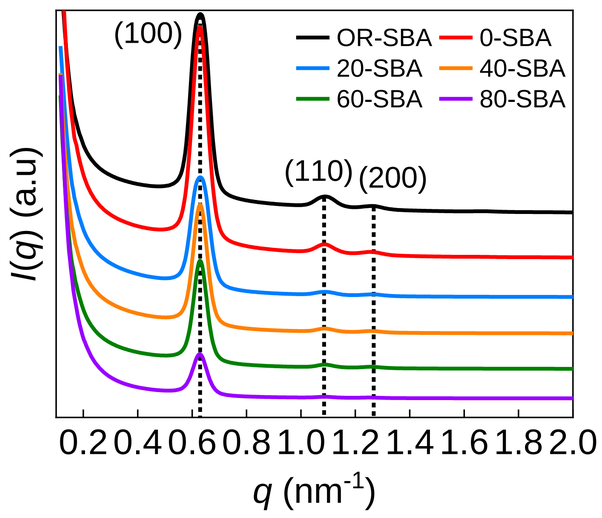


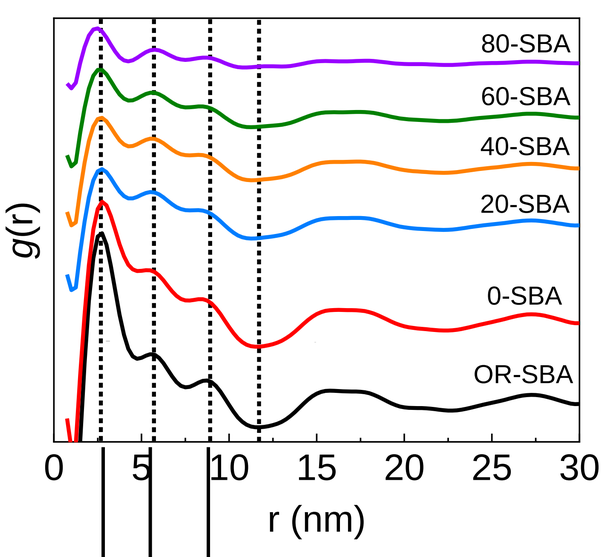


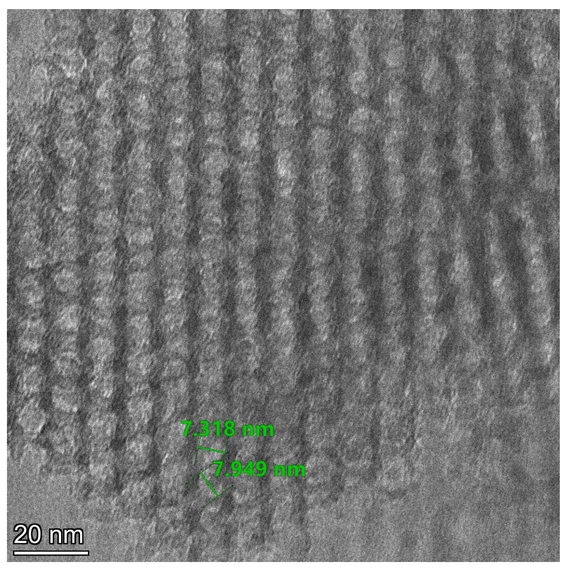


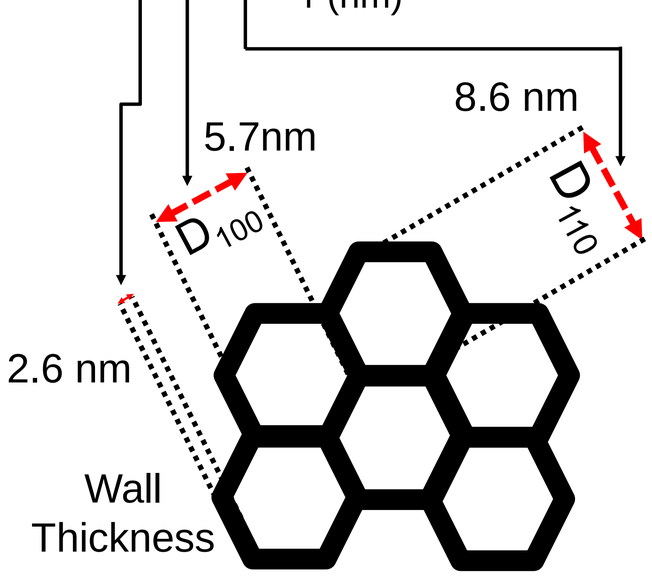












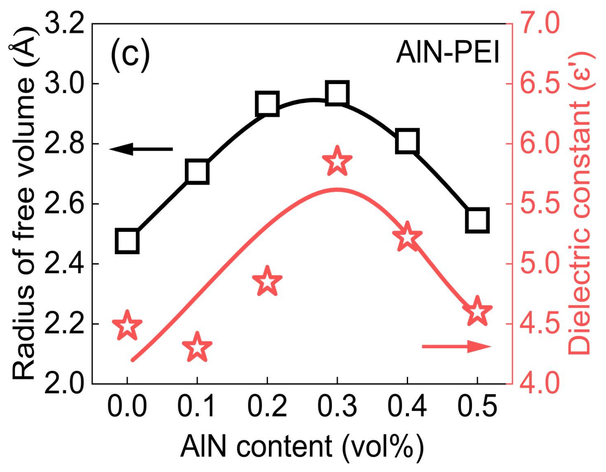
Clausius-Mossotti equation:

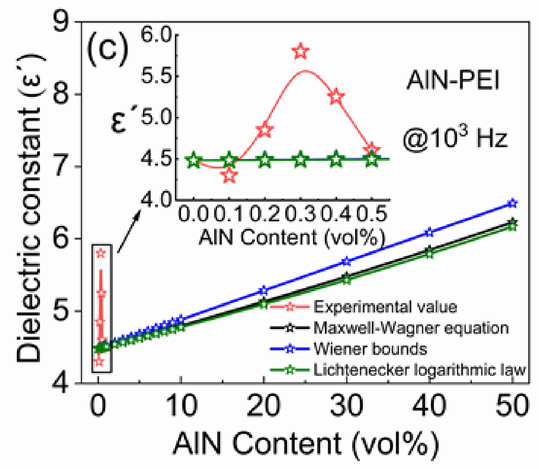
$$\frac{\varepsilon' - 1}{\varepsilon' + 2} = \frac{4\pi N}{3\varepsilon_0}\,\alpha$$

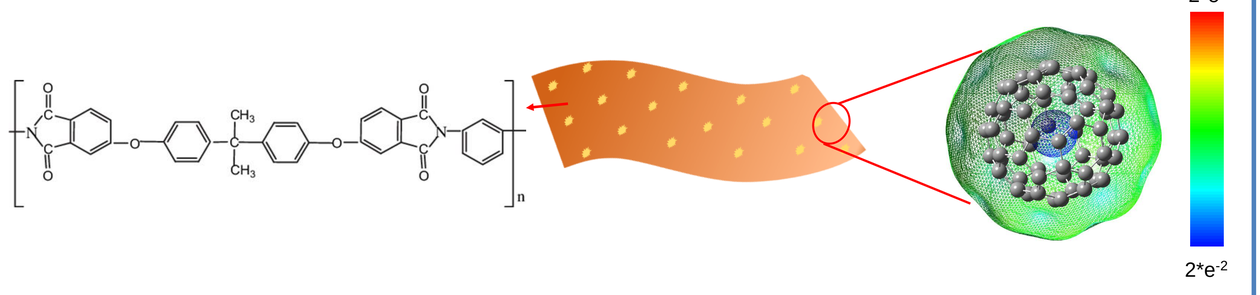
ε': Dielectric constant

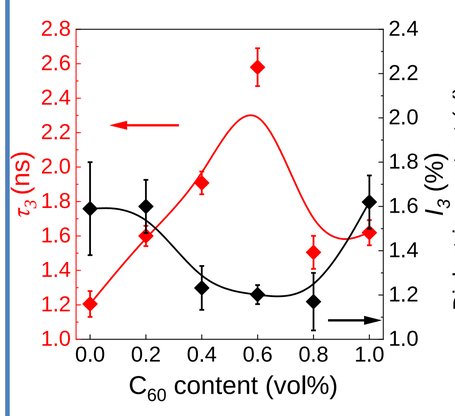
α : Polarizability

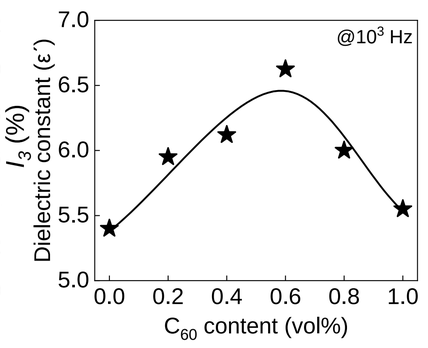
N : The number of molecules per unit volume, and which is proportional to the number of dipoles.

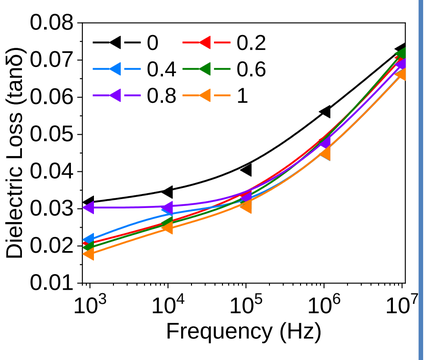


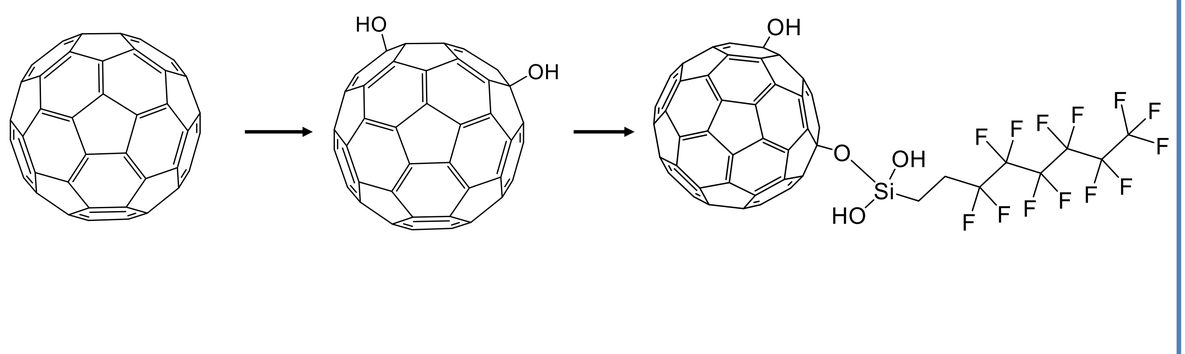


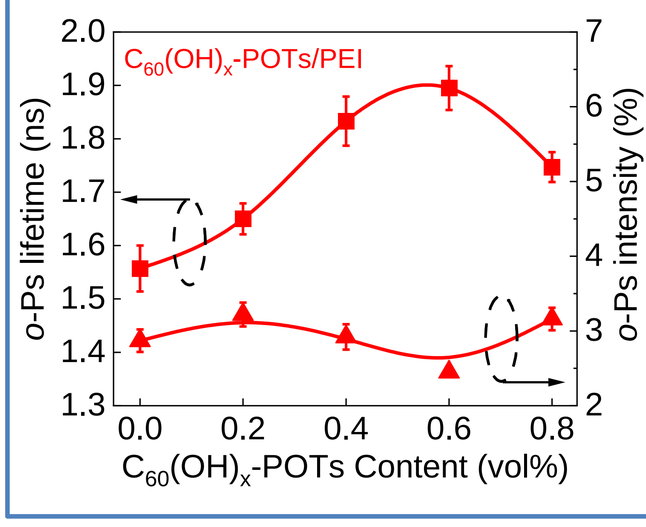


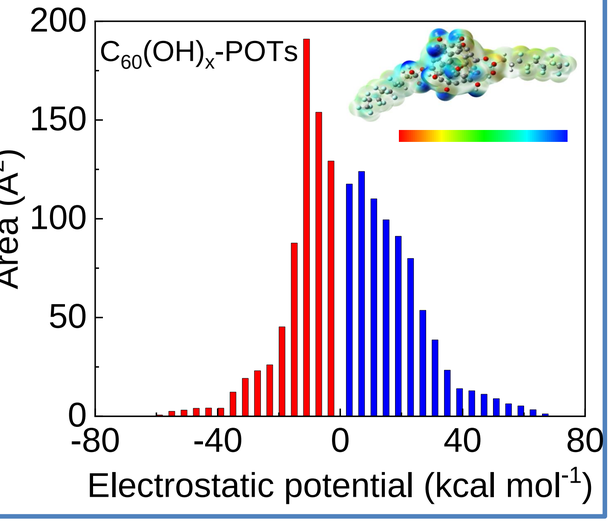












*Corresponding author email： yursh@ihep.ac.cn