Abstract：Though the space charge behavior of polyethylene under high DC or AC has been investigated and measured by many researchers, the results between different research groups have little comparability to each other. So it is difficult to achieve a universal conclusion. A lot of experimental data and former research experiences we can acquire so far indicate that many factors affect space charge behavior in a certain extent, such as doping with some types of inorganic nano powders, heating treatment process and the materials of electrode, but there is little substantial change. The space charge behavior is extremely related to the types of polyethylene probably, i.e. the types of polyethylene lead to the difference of research results on the space charge behavior. This paper focuses on the space charge distribution in high electrical field and the isothermal decay in some kinds of LDPE including Exxon-Mobil LLDPE 4004, Sino-SPC JD 200 etc. by using the Pressure Wave Propagation Method.