The Dissociation of $AgNO_3$ Having the High Lattice Energy by Phthalate Oxygens of Poly(ethylene phthalate)

강상욱[1,2], 차국헌[1], 강용수[2,*]
[1]서울대학교 화학생물공학부;
[2]한국과학기술연구원 촉진수송분리막 연구단
(yskang@kist.re.kr*)

Among many silver salts capable of reversibly forming the silver-olefin complexes in silver polymer electrolytes, $AgBF_4$ has commonly been employed because of its high carrier activity with respect to olefin molecules. However, $AgBF_4$ is generally expensive and is easily converted to silver metal, resulting in the deactivation of the silver ion-olefin carrier activity. Therefore, it is desirable to use silver salts with high lattice energy such as $AgNO_3$ in order to prevent the silver reduction, but $AgNO_3$ is rather inactive as an olefin carrier. Because $AgNO_3$ is known to exist in ionic aggregates form, the silver ions derived from $AgNO_3$ can not easily form the silver-olefin complex. PEP was used to strongly perturb $AgNO_3$ with high lattice energy to exist as free ions without any additives for the separation of olefin/paraffin mixtures. We suggest that the strong coordinative interaction between silver ion and two carbonyl oxygens from the phthalate group in PEP causes the interaction between Ag^+ and NO^{3-} to be weak, yielding the increased silver ion activity. The increased silver ion activity is verified by separation performance, FT-Raman spectroscopy and QCM.