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Investigation of Pyrene Excimer formation in various manufacturing processes and ionic structures HYUN-SOOK JANG[1], MU-PING NIEH[2], University of Connecticut — Electrospun pyrene (Py)/polystyrene/tetrabutylammonium hexafluorophosphate (TBAPF6) thin films can provide high-sensitivity and high-selectivity detection of nitro-aromatic explosives through fluorescence quenching of the Py excimers [1]. However, we have found that the formation of Py excimers in Py/PS/TBAPF6 thin films depends greatly on the manufacturing processes. Our results indicate that high solvent vapor pressure promotes the Py excimer fluorescence, while high temperature (around or greater than Tg of the PS) has an opposite effect in absence of solvent – reducing the Py excimer fluorescence. Moreover, we have found that salts structure such as cation chain length, anion strength can significantly affect the formation of Py excimer both in solution and solid state, presumably due to self-aggregation of the salts and electrostatic interactions between ions and pyrene excimer. 13C-NMR and steady-state fluorescence result indicate that the salt induces peak shift to the downfield in the spectra and quenches the Py excimer intensity drastically.

[1] Wang, Y.; La, A.; Ding, Y.; Liu, Y.;Lei, Y. Advanced Functional Materials 2012, 22, 3547.

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