

Accepted Manuscript

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Yanyan Li, Yan Zhou, Xiaoteng Jia, Danming Chao

PII: S0014-3057(18)30998-4

DOI: <https://doi.org/10.1016/j.eurpolymj.2018.07.022>

Reference: EPJ 8484

To appear in: *European Polymer Journal*

Received Date: 30 May 2018

Revised Date: 1 July 2018

Accepted Date: 17 July 2018

Please cite this article as: Li, Y., Zhou, Y., Jia, X., Chao, D., Synthesis and characterization of a dual electrochromic and electrofluorochromic crosslinked polymer, *European Polymer Journal* (2018), doi: <https://doi.org/10.1016/j.eurpolymj.2018.07.022>

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Synthesis and characterization of a dual electrochromic and electrofluorochromic crosslinked polymer

Yanyan Li ^a, Yan Zhou ^a, Xiaoteng Jia ^b, Danming Chao ^{a,*}

^aCollege of Chemistry, Jilin University, Changchun, 130012, P.R. China. E-mail:

chaodanming@jlu.edu.cn (D Chao), Tel.: +86-431-85168292; Fax: +86-431-85168292.

^bARC Centre of Excellence for Nanoscale BioPhotonics (CNBP), Macquarie University, Sydney, NSW 2109, Australia

ABSTRACT: Dual electrochromic and electrofluorochromic polymers have attracted immense attention due to their extensive applications in the fields of sensors, displays and advanced devices. We report here the electrochemical synthesis of a crosslinked polymer bearing tetraaniline, carbazole, and polyhedral oligomeric silsesquioxane through the hydrolysis reaction with good film-forming ability and outstanding thermostability. The resulting polymer with huge rigid polyhedral oligomeric silsesquioxane groups presents simultaneous electrochromic and electrofluorochromic behaviors with improved switching rate, caused by the enhanced ion diffusion. Furthermore, the contrast of on/off in the electrofluorochromism is also enhanced drastically, ascribed to the mitigation of the aggregation-caused quenching effect of fluorescence stemmed from the steric hindrance effect of polyhedral oligomeric silsesquioxane.

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