**[Powerful direct C–H amidation polymerization to give single-fluorophore-based white-light-emitting polysulfonamides by fine-tuning hydrogen-bond](https://acs.digitellinc.com/acs/live/22/page/677/1?eventSearchInput=Soon-Hyeok+Hwang&eventSearchDateTimeStart=&eventSearchDateTimeEnd=" \l "sessionCollapse394206)**

[*Soon-Hyeok Hwang*](https://acs.digitellinc.com/acs/live/22/page/677/1?eventSearchInput=Soon-Hyeok+Hwang&eventSearchDateTimeStart=&eventSearchDateTimeEnd=)*,* [*Hongsik Kim*](https://acs.digitellinc.com/acs/live/22/page/677/1?eventSearchInput=Soon-Hyeok+Hwang&eventSearchDateTimeStart=&eventSearchDateTimeEnd=)*, [Hanseul Ryu](https://acs.digitellinc.com/acs/live/22/page/677/1?eventSearchInput=Soon-Hyeok+Hwang&eventSearchDateTimeStart=&eventSearchDateTimeEnd=), [Dongwhan Lee](https://acs.digitellinc.com/acs/live/22/page/677/1?eventSearchInput=Soon-Hyeok+Hwang&eventSearchDateTimeStart=&eventSearchDateTimeEnd=), and*[*Tae-Lim Choi*](https://acs.digitellinc.com/acs/live/22/page/677/1?eventSearchInput=Soon-Hyeok+Hwang&eventSearchDateTimeStart=&eventSearchDateTimeEnd=)

*Seoul National University*

The development of white-light-emitting polymers has been actively reported because of their important roles in various application fields such as lighting sources, displays, etc. To generate white-light, numerous research efforts have focused on synthesizing multi-fluorophores-based random copolymers to cover the entire visible region effectively. However, due to their intrinsic synthetic and structural features, this strategy has some limitations in securing color reproducibility and stability. Herein, we report a development of single-fluorophore-based white-light-emitting homopolymers with excellent color reproducibility. A powerful direct C–H amidation polymerization (DCAP) strategy allowed us to synthesize defect-free polysulfonamides which emitted white-light via a process called the excited-state intramolecular proton-transfer (ESIPT). To get a structural insight for designing such polymers, we conducted detailed model studies by varying the electronic nature of substituents which lead to easy tuning of emission colors. Further analysis revealed that this was due to precise control on the thermodynamics of the ESIPT process by fine-tuning the intramolecular hydrogen-bond strengths. By applying this design principle to polymerization, we could successfully produce various well-defined polysulfonamides with single-fluorophore emitting white-light. The resulting polymers emit consistent fluorescence regardless of molecular weights or phases (solution, powder, and film), guaranteeing excellent color reproducibility. With these advantages in hand, we also demonstrated a practical use of our DCAP system by fabricating white-light-emitting coated LED.

