Synthesis and characterization of a TADF polymer containing a tetraphenylsilane unit in its main chain

René A. Hauyon\textsuperscript{1}, Denis Fuentealba\textsuperscript{2}, Jean Medina\textsuperscript{1}, Patricio A. Sobarzo\textsuperscript{3}, Ignacio A. Jessop\textsuperscript{4}, Alain Tundidor-Camba\textsuperscript{1}, Claudio A. Terraza\textsuperscript{1}

\textsuperscript{1}Research Laboratory for Organic Polymers(RLOP), Faculty of Chemistry and Pharmacy, Pontificia Universidad Católica de Chile, cterraza@uc.cl. \textsuperscript{2}Biosupramolecular Chemistry Laboratory, Faculty of Chemistry and Pharmacy, Pontificia Universidad Católica de Chile. \textsuperscript{3}Faculty of Science, Universidad Austral de Chile. \textsuperscript{4}Department of Chemistry, Universidad de Tarapacá.

Thermally activated delayed fluorescence (TADF) opened the door to the third generation of OLEDs by achieving a similar efficiency compared to second generation OLEDs which uses phosphorescence for light emission, but without the need of expensive metal atoms such as Ir.\textsuperscript{1} Many small molecules have been reported as emitting layers of TADF-OLEDs, however polymers have been less so, even though they have certain advantages over small molecules, such as, greater morphological stability in thin-film state. Nevertheless, there is great interest in the synthesis of TADF polymers as in-solution processable materials for large-area OLEDs. TADF polymers may incorporate TADF units from small molecules along with separating non-conjugated units in the main chain, isolating the TADF units, with the aim of retaining their photophysical properties while improving others such as thermal and morphological stability.\textsuperscript{2} Tetraphenylsilane is a non-conjugated unit that has been used in electroluminescent polymers for its useful characteristics such as high-triplet energy and high thermal stability\textsuperscript{3}, but has been scarcely used in TADF materials. Here, a novel tetraphenylsilane containing TADF polymer is synthesized using the backbone-TADF unit strategy. This polymer shows high thermal stability and retain some of the photophysical properties of the TADF unit in which it is based such as emission maxima and TADF behavior.

![Diagram of TADF polymer](image.png)

**Figure 1.** Tetraphenylsilane-containing TADF polymer reported in this work.

References