Synthesis of linear Trisilane Compounds and Its Photophysical Properties

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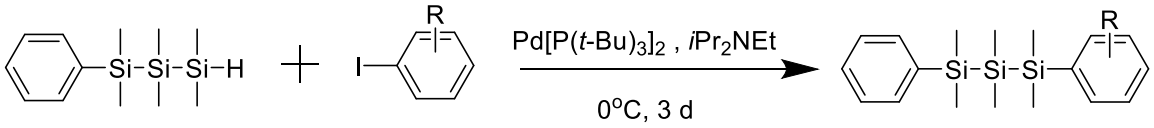
In recent years, oligosilane conjugated system have received attention because of their σ-π conjugated abilities, resulting in unique optical and electrochemical properties[1]. Many attempts have been made to synthesize diverse oligosilane compounds with Donor(D)-Acceptor(A) system to produce intense fluorescence, enhanced aggregation-induced emission (AIE) properties, and achieved advanced stimuli responsive materials[2]. While many study focused on disilane bridged molecule, trisilane bridged molecule is rarely found due to its synthesis difficulties. Therefore, this study tried to synthesize several linear trisilane compounds through palladium mediated coupling reaction between hydrosilane and aromatic iodides. Synthesized compounds were characterized with ^{1}H-NMR, ^{13}C-NMR, and HRMS. Their photophysical properties were studied using UV-VIS and fluorescence spectroscopy, their quantum yields and fluorescence lifetimes were also measured. DFT/TD-DFT calculations were carried out to investigate their electronic structures.

Keyword: Oligosilane, Trisilane compound, σ-π conjugation, *Photopysical properties, Intramolecular charge transfer*

Synthesis schematic (This study):



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