In recent years, organic phosphorescent solids have evoked considerable interest due to their potential applications, such as stimuli responsive switches, optoelectronic devices and chemosensors [1]. They represent an important alternative to heavy metal ion-based triplet emitters in the solid state and to quantum dots incorporating toxic elements, because of their lower toxicity, cost effectiveness, and easy amenability [2]. In the present work, substituted benzenes such as hexakis(phenyloxy)benzene 1, hexakis(phenylthio) benzene 2, hexakis(phenylselanyl) benzene 3 and 1,3,5-tribromo-2,4,6-triophenoxybenzene 4 has been synthesized, examined their crystal structure and explored their photo physical activities in the solution and solid state(crystal). All compounds are non-emitting in solution, but in the solid state at room temperature they are phosphorescent with emission lifetime 2-23µs. Among them compound 2 is highly phosphorescent. When the molecule is in dilute solution, the potentially luminescent excited state mainly deactivates non-radiatively by intramolecular rotation. Aggregation due to crystallization restricts intramolecular rotation, decrease the conformational mobility, and the radiative decay process becomes predominant. The CH-π interactions between neighbouring aryl groups facilitates the inter system crossing which in turn result in efficient AIP [3].


Keywords: Aggregation Induced Phosphorescence (AIP) of Substituted Benzenes