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Asymmetric Zinc Phthalocyanines as Dye-Sensitized Solar Cells. GULENAY TUNC, YUNUS YAVUZ, AYSEGUL GUREK, BETUL CANIMKURBEY, ARIF KOSEMEN, SAIT EREN SAN, VEFA AHSEN, Gebze Technical University — Dye-sensitized solar cells (DSSCs) have received increasing attention due to their high incident to photon efficiency, easy fabrication and low production cost . Tremendous research efforts have been devoted to the development of new and efficient sensitizers suitable for practical use. In TiO2-based DSSCs, efficiencies of up to 11.4% under simulated sunlight have been obtained with ruthenium polypyridyl complexes. However, the main drawback of ruthenium complexes is the lack of absorption in the red region of the visible light and the high cost. For this reason, dyes with large and stable p-conjugated systems such as porphyrins and phthalocyanines are important classes of potential sensitizers for highly efficient DSSCs. Phthalocyanines (Pcs) have been widely used as sensitizers because of their improved light-harvesting properties in the far red- and near-IR spectral regions and their extraordinary robustness [1]. In this work, a series of asymmetric Zn(II) Pcs bearing a carboxylic acid group and six hexylthia groups either at the peripheral or non-peripheral positions have been designed and synthesized to investigate the influence of the COOH group and the positions of hexylthia groups on the dye-sensitized solar cell (DSSC) performance.

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