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## **Investigation of effect of anti-aggregation agent on the performance of nanostructure dye-sensitized solar cells**

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### **Abstract:**

Dye sensitized solar cells (DSSCs) based on indigo dyes exhibit suitable conversion efficiency. These organic dyes have been undergone for aggregation. Electron transfer process is reduced due to an aggregation of molecular dyes. Therefore, anti-aggregation agent is commonly utilized in fabrication of DSSCs. In the present study, two anti-aggregation agents namely as  $3\alpha,7\alpha$ -dihydroxy- $5\beta$ -cholanic acid (cheno) and  $3\alpha,7\alpha,12\alpha$ -trihydroxy- $5\beta$ -cholanic acid (cholic acid) were added to indigo dye solution in DSSCs in order to determine the photovoltaic parameters such as short circuit photocurrent, open circuit voltage and conversion efficiency of each individual dye in the absence and presence of anti-aggregation agents. The results show that the conversion efficiencies are improved with reduced aggregation. Spectrophotometric evaluations of the indigo dyes in solution and on a  $\text{TiO}_2$  substrate were carried out in the absence and presence of anti-aggregation agents in order to estimate changes in the status of the dyes in different environments. J-type aggregates on the nano  $\text{TiO}_2$  are reduced in the presence of anti-aggregation agents.