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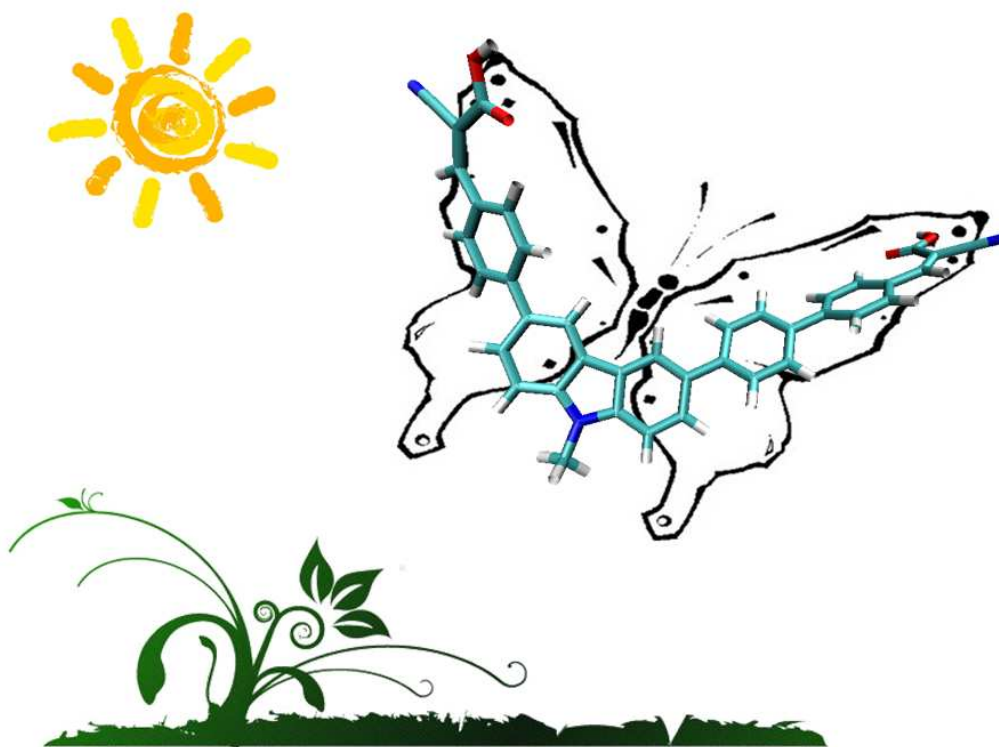
## Graphical Abstract

New carbazole-based dyes with asymmetric butterfly structure for dye-sensitized solar cells: Design and properties studies

Kenan Sun, Yuan Ma, Weiyi Zhang, Yaping Wen, Li Wang\*, Jinglai Zhang\*

*Institute of Environmental and Analytical Sciences, College of Chemistry and Chemical*

*Engineering, Henan University, Kaifeng, Henan 475004, P.R. China*



\*Corresponding author E-mail: [chemwangl@henu.edu.cn](mailto:chemwangl@henu.edu.cn)

\*Corresponding author E-mail: [zhangjinglai@henu.edu.cn](mailto:zhangjinglai@henu.edu.cn)

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