



Synthesis Of Heteroatom Containing Polycyclic Aromatic Hydrocarbons

Tech ID: 30103 / UC Case 2019-232-0

SUMMARY

UCLA researchers in the Department of Chemistry & Biochemistry have developed an approach for synthesizing nitrogen-containing polycyclic aromatic hydrocarbons with high yield.

BACKGROUND

There is a widespread use of nitrogen-containing heterocyclic compounds in small-molecule pharmaceutical intermediates. There is also a growing need for new organic compounds with interesting photophysical properties, particularly for their application in electronic devices such as OLEDs. Heterocyclic compounds, especially those including nitrogen, have been studied extensively in high performance OLED devices and play an important role in improving device efficiency while reducing the operating voltage. The key challenges with these organic compounds are identifying new structures and discovering ways to synthesize them using a scalable approach. Thus, new approaches for synthesizing nitrogen-containing heterocyclic compounds are needed.

INNOVATION

UCLA researchers have developed a facile synthetic chemistry method to make polyaromatic hydrocarbon compounds that contain nitrogen substituents. The method provides access to a range of interesting and unique compounds with enticing photophysical properties. For example, an additional heterocycle is introduced to the system in 73% yield. Moreover, the synthesis’ modular approach could allow access to compounds with four axes of substitution, such as four different aromatic groups. The compounds are expected to prove useful in materials chemistry and electronic devices.

APPLICATIONS

- ▶ Organic synthesis
- ▶ Pharmaceutical intermediates
- ▶ Fluorescent molecules
- ▶ OLEDs
- ▶ Organic solar cells

ADVANTAGES

- ▶ Facile synthesis method
- ▶ Enticing photophysical properties
- ▶ High product yield
- ▶ Diverse compounds possible

PATENT STATUS

| Country | Type | Number | Dated | Case |
|---------------------------|--------------------------------|-------------|------------|----------|
| Patent Cooperation Treaty | Reference for National Filings | 2020/041369 | 02/27/2020 | 2019-232 |

Patent Pending

RELATED MATERIALS

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INVENTORS

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OTHER INFORMATION

KEYWORDS

diels-alder cycloadditions, polycyclic aromatic hydrocarbons, nitrogen-containing polyaromatic hydrocarbons, materials chemistry, organic electronics, OLEDs

CATEGORIZED AS

- ▶ Optics and Photonics
 - ▶ All Optics and Photonics
- ▶ Energy
 - ▶ Solar
- ▶ Materials & Chemicals
 - ▶ Chemicals
- ▶ Semiconductors
 - ▶ Materials

RELATED CASES

2019-232-0

► [Barber, J.S., Yamano, M.M., Ramirez, M., Darzi, E.R., Knapp, R.R., Liu, F., Houk, K.N. and Garg, N.K., 2018. Diels–Alder cycloadditions of strained azacyclic allenes. Nature Chemistry, 10\(9\), p.953.](#)

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

► [Cross Coupling of Phenolic Derivatives](#)

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