BOTTOM-UP APPROACH TO NANOGRAPHENES VIA ARYNES

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In recent years, graphenes have attracted huge attention because of their unique structures and properties.[1] These carbon-based materials have great potential as the basis of optical and electronic devices. Graphenes are normally prepared from graphite in a *top-down* approach based on exfoliation of graphite under harsh conditions. As a result, mixtures of carbon-based materials with different sizes and structural defects are usually obtained. One of the biggest challenges to be addressed in order to integrate graphenes into high performance electronic devices is to avoid the structural *inhomogeneity* implicit with their current syntheses.

In this communication we present our efforts to synthesize well-defined nanographenes using controlled *bottom-up* approaches under mild reaction conditions. These synthetic methodologies allow preparing these carbon-based materials in the same way as nanosized polycyclic aromatic hydrocarbons (PAHs).[2] These approaches minimize difficulties associated with processing, manipulation and characterization of graphene derivatives. In particular, our approach is based on the palladium-catalyzed [2+2+2] cycloaddition of arynes.[3] Figure 1 shows some examples of nanographenes that can be obtained using this methodology.

References:

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[2] Wu, J.; Pisula, W.; Müllen, K. *Chemical Reviews*, **107** (2007) 718.
[3] Romero, C.; Peña, D.; Pérez, D.; Guitián, E. *Chemistry - A European Journal*, **12** (2006) 5677.

Figure 1: Typical nanographenes obtained in our lab by palladium-catalyzed [2+2+2] cycloaddition of arynes (**1-3**). Compounds **4** and **5** are under preparation using the same methodology.