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Atti del Convegno

Exploiting the Features of a Dopamine Derivative for High Functionalization of SWCNTs: Immobilization of Pd Nanoparticles for the Preparation of a Recyclable Catalyst

V. Campisciano,[a] L. Valentino,[a] M. L. Alfieri,[b] V. La Parola,[c] A. Napolitano,[b] F. Giacalone,[a] M. Gruttadauria[a]

[a]*Department of Biological, Chemical and Pharmaceutical Sciences and Technologies (STEBICEF) and INSTM UdR University of Palermo, Viale delle Scienze, Ed. 17 90128, Palermo (Italy)*
[b]*University of Naples "Federico II", Via Cintia 4, I-80126, Naples (Italy)*
cIstituto per lo Studio dei Materiali Nanostrutturati (ISMN)-CNR, Via Ugo La Malfa 153, I-90146 Palermo
vincenzo.campisciano@unipa.it

The covalent functionalization of single-walled carbon nanotubes (SWCNTs) is a fundamental task for the full exploitation of the unique properties of such allotropes of carbon in different fields. The covalent approach is usually associated with the disruption of SWCNTs π-network due to the rehybridization from sp^2 to sp^3 of sidewall carbon atoms involved in the functionalization process. This event could have detrimental consequences that may affect the mechanical, electronic, and thermal properties of CNTs.

Recently, some evidence on the possibility to preserve π-conjugation of SWCNTs functionalized by means of [2+1] cycloaddition of nitrene, which was in situ generated from an electron-poor azide, was provided.[1] Here we have chosen dopamine as a precursor for the corresponding dopamine azide, which upon reaction with SWCNTs can lead to rehybridization of the sidewall carbon atoms following a different route, as depicted in Figure 1. Despite the high degree of functionalization reached (60 wt%), further investigations on the functionalized CNTs allowed to confirm a low disruption of the π-network. The obtained material was used as support for Pd nanoparticles generating a recyclable heterogeneous catalyst for the reduction of nitro compounds and for the Heck reaction.[2]

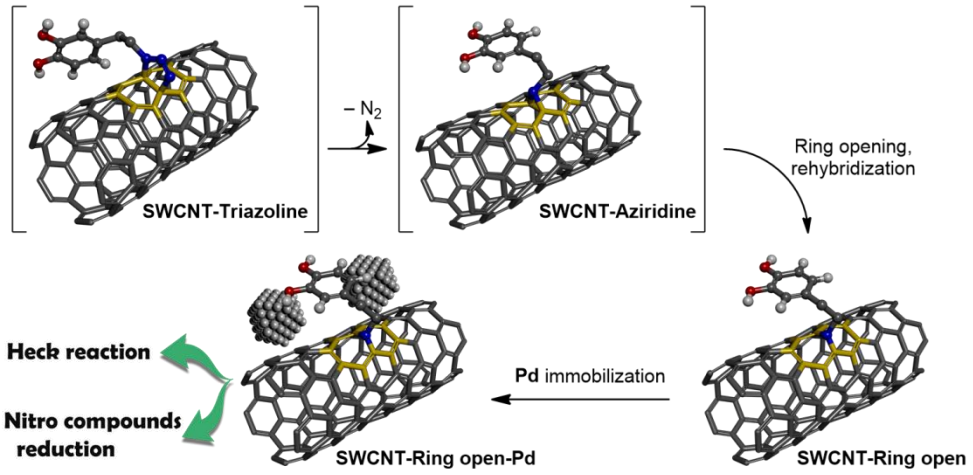

Figure 1: dopamine azide functionalized SWCNTs and immobilization of Pd nanoparticles.

References

[1] A. Setaro, M. Adeli, M. Glaeske, D. Przyrembel, T. Bisswanger, G. Gordeev, F. Maschietto, A. Faghani, B. Paulus, M. Weinelt, R. Arenal, R. Haag, S. Reich, *Nat. Commun.* **2017**, *8*, 14281.
[2] V. Campisciano, L. Valentino, M. L. Alfieri, V. La Parola, A. Napolitano, F. Giacalone, M. Gruttadauria, *submitted*.