

# How to teach an old dog new (electrochemical) tricks: Aziridine-functionalized CNTs as efficient electrocatalysts for the selective CO<sub>2</sub> reduction to CO

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## Abstract

© 2018 The Royal Society of Chemistry. The electrocatalytic conversion of CO<sub>2</sub> to energy-rich chemicals or energy vectors is a highly challenging approach to cope with an ever increasing demand for energy storage and valorization of renewable resources. Herein we report on the electrocatalytic reduction of CO<sub>2</sub> to CO using covalently N-decorated carbon nanotubes as highly efficient and chemoselective metal-free electrocatalysts. At odds with more conventional synthetic methods for the production of N-doped nanocarbons, chemical functionalization warrants a unique control of "surface N-defects" available for the process, ruling out any synergistic contribution to electrocatalysis coming from other surface or bulk N-containing groups. With a CO faradaic efficiency (FECO) close to 90% and productivity as high as 48 NLCO gN<sup>-1</sup> h<sup>-1</sup>, NH-aziridine functionalized MWCNTs have shown CO<sub>2</sub>RR performance that is among the highest reported so far for related metal-free systems. At the same time, it has offered a unique view-point for the comprehension of the underlying structure-reactivity relationship.

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