The dual role of Carbon in the energy transition

Matteo Maestri
Department of Energy - Politecnico di Milano

Abstract
The pressing issue of global warming is widely acknowledged to stem from our current energy scenario, which has led to the release of tremendous amounts of CO_2 from the burning of fossil fuels and the extraction of metals for material production, resulting in excessive CO_2 concentrations in the atmosphere. To address this issue and achieve a neutral carbon footprint by 2050, rebalancing CO_2 levels in the atmosphere is crucial. Carbon can play a decisive role in achieving this goal by fulfilling a dual role: (i) developing valorisation routes of CO_2 and biomass to useful molecules and (ii) using carbon as a material rather than a fuel. In this talk, I will showcase two examples of this dual role of Carbon in the energy transition, such as the operando-Raman kinetic analysis of surface carbon formation during methane dry reforming and the multiscale analysis of the synthesis carbon nanotubes from methane at large scale.