PhD COURSE - 1CFU

11-12 May 2017 14:00-16:00 Via Giuria 7 Aula Diagonale

The "Energy Principle" in Green Chemistry is 25 year-old and…

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We recently celebrated the 25th anniversary[1,2] of the twelve principles of green chemistry. [3]

This course will address this silver anniversary, discussing in particular the relevance and the changes around the sixth of the 12 principles: the "energy principle".[4] In twenty-five years, renewable energies, their production, their distribution and their storage have gained a major role in shaping how green chemistry addresses the "energy challenge", without phasing out the original question of how to minimize (fossil) energy consumption. The necessity of a more carbon–sober future becomes acute only against the menacing backdrop of the environmental climate context.

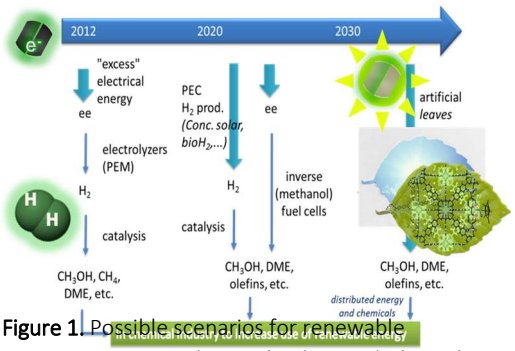

Figure 1. Possible scenarios for renewable energy injection in chemical industry. (Adapted from ref. 4)

This course will review some elements of this environmental context while showing research examples on how disruptive CO_2 or N_2-based chemistries can, among other routes, facilitate the transition to a carbon-sober future by harvesting and distributing *green electrons*[3], key intermediaries between renewable energy sources and our current infrastructures.[5]

Elsje Alessandra Quadrelli is Director of Research at CNRS and chair of the Sustainability Chair at the École Supérieure de Chimie Physique Électronique de Lyon (CPE Lyon). In this context, she founded and chairs the "CO_2 Forum", a biyearly international conference on CO_2 utilisation for a circular carbon economy. She graduated from Scuola Normale Superiore di Pisa and holds a PhD in organometallic chemistry from the University of Maryland at College Park.

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[1] P. Anastas, B. Han, W. Leitner, M. Poliakoff « "*Happy silver anniversary*" *: Green Chemistry at 25* » , **Green Chem.** ***18***, 12-13 (2016) .
[2] This article is part of the themed collection: "Happy silver anniversary": Green Chemistry at 25
[3] P. T. Anastas, J. C. Warner « *Green Chemistry: Theory and Practice*"; Oxford University Press: Oxford, U.K., 1998.

[4] E. A. Quadrelli, « *25 Years in "Principle 6: Energy and Green chemistry :* Saving, Storing, Distributing and Using Energy responsibly. » **Green Chem.** *18*, 328–330 (2016). (see also ref 2)
[5] G. Centi, E. A. Quadrelli, S. Perathoner, « *Catalysis for CO_2 conversion to introduce renewable energy in the value chain of chemical industries*» **Energy Env. Sci.** *6*, 1711–1731 (2013).