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"This book shows the interesting versatility of supercritical fluid technology in materials preparation for completely novel applications. The authors, as well as the editors, are internationally recognized experts who have put together an enjoyable and useful recompilation of the main discoveries in the development of this new green technology."

Dr. Julio San Román
Institute of Polymer Science and Technology (ICTP-CSIC), Spain

The environmental and climate program demands technological solutions in the chemical industry that incorporate prevention of pollution. Major advances are needed to reduce the use of organic solvents, such as methanol, toluene, xylene, methyl ethyl ketone, and dichloromethane, which account for 27% of the total Toxics Release Inventory chemicals. The replacement of those solvents is key to enable the transition from classical synthesis to green chemistry and nanotechnology concepts—that is, to sustainability. The first radical option to achieve this goal is to completely avoid the use of solvents, as occurs in mechanochemical processes. A wide-range synthesis prospect is given by identifying in known solvents those with less negative environmental impact. This book concerns the analysis of the advantages of using compressed CO_2 to produce not only improved materials in a better way, but also new nanoproducts. Recovering and using CO_2, otherwise released into the atmosphere, is a means of recycling emissions resulting from other users. The use of supercritical CO_2 is a complex option from a conceptual point of view requiring enhanced technical preparation.

Concepción Domingo received her MSc in chemistry at the University of Barcelona (Spain) followed, in 1992, by a PhD in materials science. In 1994 she joined the Chemical Engineering Department at the TU-Delft (the Netherlands), starting the research in the area of supercritical fluids. Currently, she is leader of the Supercritical Fluids and Functional Materials group at the Materials Science Institute of Barcelona (CSIC). She has focused her scientific objectives on the synthesis, characterization, and development of micro- and nanoparticulate systems and the preparation of composite materials by using two major groups of processing methods: colloidal solutions and sol–gel routes to supercritical solutions. Dr. Domingo has published more than 100 articles in internationally recognized journals, most of them related to supercritical fluid technology for nanomaterials preparation, encapsulation, and functionalization, applied to biomaterials and high-tech functions. Most of her research is directed to the synthesis and functionalization of porous systems using supercritical CO_2 for high-performance applications.

Pascale Subra-Paternault is a CNRS senior scientist who has been working with supercritical fluids for more than 25 years in the fields of natural products, crystallization, particles generation, and modification (precipitation, formulation, coating, infiltration, surface grafting). After obtaining a PhD in analytical chemistry in 1989, she pursued her career at LIMHP (Materials and Process Engineering), spent a year at Princeton University, USA (P. Debenedetti's group), moved to Université de Bordeaux in 2006, and joined CBMN Institute in 2011 (processing bio- and pharmaceutical molecules), where she leads a team of 10 members. Her research, supported by European, national, and private funding, is currently focused on extraction, purification, and formulation of bioactive molecules (mostly lipids and polyphenols) and fabrication of cocrystals.

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