

Breaking boundaries

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Observing minerals, glasses and multicomponent materials through the real nature of their constituting atomic sites was a major scientific occupation over my scientific life. I was lucky enough to live in a time that has seen an explosion of instrumental, experimental and theoretical approaches in mineralogy and geochemistry. This allowed a unified vision of the structure of geomaterials, including nanos and mineral surfaces, "amorphous" materials, speciation of contaminants or radiation-induced defects. I want here to recall the memory of my late colleagues and friends, Philippe Ildefonse and Jean-Pierre Muller, who facilitated the emergence of this field at LMCP/IMPMC. A similar approach on technological materials provided clues on structure-property relationships and this was for me the occasion of a long term collaboration with major industrial R&D centers and the French Atomic Energy Commission. I am glad that about half of my students found a position in these areas. Finally, in the last few years, a move to sustainable development and cultural heritage also illustrated for me the interest of breaking boundaries.

Among the tools available to the Geoscience community, spectroscopic methods and the fast emerging synchrotron radiation facilities deserve a special attention, as they are now widespread, contributing to break boundaries between mineralogical, geochemical, environmental and materials sciences. This interdisciplinarity illustrates the concept of "Geochemistry of solids", advocated by Bill Fyfe more than 50 years ago. The advent of synchrotron centers at the end of the 70s opened fascinating opportunities, made possible by breaking boundaries between mineralogy and physics/chemistry, as I did in the LMCP through a collaboration with Jacqueline Petiau. As Orsay/LURE and Stanford/SSRL synchrotrons were operational almost at the same time, this started a continuous and very fruitful collaboration with Gordon Brown at Stanford, implying also our students and former students, a collaboration still very active nowadays. Finally, I want to underline that I was fortunate enough to continuously work with a number of bright students. Doing research is not a lonely activity and it is always fascinating to see how young researchers are eager to develop new scientific fields.