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French network on solvation (GDR 2035 SolvATE): Foreword

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Foreword

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It is fitting to begin this historical overview with an anecdote. The first time the possibility of developing a national network dedicated to solvation was raised by the two future members of the SolvATE leadership dates back to December 2014, on the occasion of a PhD defense in Nancy. The location was particularly appropriate, as we were in the premises of the former laboratory of Professors Jean Barriol and Jean-Louis Rivail. The memory of those discussions never faded, and the idea of establishing a CNRS Research Network (GDR being the French acronym) gradually took shape.

In May 2017, following an initial email contact about solvation research from the perspective of both French theorists and experimentalists, we quickly moved toward organizing a "Perspectives Meeting" in Paris. Twenty-five researchers, representing about twenty laboratories (from the Paris region, Lille, Nancy, Dijon, Toulouse, Rennes, Clermont-Ferrand, Lyon, Strasbourg, and Poitiers), discussed in detail the scientific goals of the GDR, as well as its budget structure and governance. A detailed report was then sent to all interested laboratories, enabling the integration of additional suggestions and comments into the final version of the project, submitted in September 2017, together with the individual laboratory forms signed by the various institutional bodies.

In the autumn of 2017, further discussions with the CNRS Institute of Chemistry (INC), following the submission of the project, helped identify potential weaknesses and avenues for improvement. In particular, exchanges with Professor Philippe Hapiot led to contact with other French laboratories with significant research activity in the field of solvation. A meeting at CNRS headquarters in Paris with Professors Claire-Marie Pradier and Daniel Borgis provided valuable insight into the need to better structure the scientific project and clarify its governance. All of these highly constructive remarks led to the creation of SolvATE (GDR 2035), which was officially announced in January 2018. At the same time, the SolvATE website[1] and mailing list were created and have since served as communication tools within the network.

An essential mission of the SolvATE network is to bring forward the broad issue of solvation as a major transversal field in chemistry and physical chemistry. Our aim is to promote exchanges and interactions among French researchers, both theoreticians and experimentalists, who investigate solvent effects at the molecular level to understand chemical processes from different yet complementary perspectives, and to encourage collaborations with high level international groups. We are proud to see that, after eight years of shared activity, we are a highly dynamic community conducting research of international standing. Through our meetings and scientific actions, we stimulated the emergence of cutting-edge projects in order to build competitive funding applications for national and international calls,

[1] https://solvate.cnrs.fr/

to increase the visibility of the community to partners outside academia. We have actively involved young scientists (PhD students and postdoctoral researchers), and organized initiatives for outreach and research training, the details of which can be found on our website.

Our activities are structured in three research axes. In Axis 1 (Solvents in chemistry: toward a sustainable future), we focus on developing experimental and theoretical techniques to elucidate solvent effects on chemical reactivity, in a context of innovation aimed at environmentally responsible technological and industrial applications.

Within Axis 2 (Solvation and interfaces/surfaces, nanoconfined environments), we study chemical processes occurring at interfaces/surfaces and within nanoconfined media display specific features that can be exploited to construct a new chemistry in solution. In phenomena underlying many chemical processes (distillation, extraction, materials development) as well as in fields such as electrochemistry and microfluidics, a microscopic understanding of the behavior of solvated molecules in the presence of interfaces is essential.

Finally, in Axis 3 (Solvation in systems of biological, pharmaceutical, and agri-food interest), we engage both in fundamental research and in applications related to the design of pharmaceutical and agri-food processes.

In conclusion, the establishment and maturation of the SolvATE network has led to the consolidation of a vibrant and cohesive scientific community, now firmly recognized at the national level for its expertise in solvation science. The structuring efforts undertaken over the past years have created a solid foundation for future developments. Building on this momentum, the community is now well positioned to broaden its scope, foster new strategic alliances, and engage more actively with European partners. This special issue thus marks not an endpoint, but rather a decisive step toward expanding the visibility and impact of SolvATE beyond national borders, with the ambition of contributing to a wider European research landscape in solvation science.

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