Preface

Special issue: “Light-Induced Processes in Cryogenic Matrices”

Since the pioneer experiments of Pimentel and Porter in the sixties of the XX Century, matrix isolation gained a place as a well-established method, being currently applied as a powerful tool in several fields of research in Chemistry and Physics. In the last few years, matrix isolation has received strong stimulus, due to the availability of new instrumentation and development of a number of hyphenated techniques. The unique sampling conditions achieved in cryogenic matrix media opened the possibility to follow mechanistically complex chemical reactions and intricate physical processes induced by light. Photoinduced processes in cryogenic matrices are nowadays intensively investigated in many laboratories worldwide. Time appears then appropriate to collect a number of papers authored by prominent scientists working in this area. The contributions presented in the current Special Issue show a variety of up-to-date applications of the matrix isolation technique to the investigation of light-induced processes in molecular systems. Occurrences of photoinduced conformational transformations are described for 1-propanol (by Wassermann, Suhm, Roubin and Coussan), oxalic acid monoamide (Maier, Endres and Reisenauer), β-alanine (Stepanian, Ivanov, Smyrnova and Adamowicz) and glycine (Bazsó, Magyarfalvi and Tarczay). Halogen and hydrogen atom detachment and transfer processes are reported for adenine (iizumi, Ninomiya, Sekine and Nakata), o-chlorobenzaldehyde (Tanaka, Fujiwara, Ogawa and Nishikiori), chloro-derivatives of resorcinol (Nagaya, iizumi, Sekine and Nakata), iso-tribromomethanes (George, Kalume, Reid, Esselman and McMahon), halogenated phenol (Nanbu, Sekine and Nakata), ethyltioxorhenium (Morris, Greene, Green and Downs), maleic hydrazide (Reva, Almeida, Lapinski and Fausto) and isocytosine (Ivanov, Stepanian and Adamowicz). Other types of rearrangements and isomerisations are represented in the works on tetrazole-saccharyl conjugate (Ismael, Borba, Duarte, Giuliano, Gómez-Zavaglia and Cristiano) and six-atomic [2C, 2N, 2S] isomeric structures (Vörös, Bázsó, Tarczay and Pasinszki). Investigations on the structure and light-induced reactions of complexes between nitrous acid and methanethiol (Grzegorczyk and Mielke) and between formic acid and xenon (Cao, Melavuori, Lundell, Rásànen and Khriachtchev) are reported. Molecules containing covalently-bound rare gas atoms were prepared by photolysis of cyanodiacetylene in krypton and xenon matrices (Turowski, Gronowski, Guillemin and Kolos). Finally, low-temperature matrices were used to trap mass-selected protonated pyrene and coronene cations (Garkusha, Paliara, Maior), as well as products of 3-azidopropionitrile pyrolysis (Pinto, Dias, Levita, Rodrigues, Barros, Dyke and Costa).

The papers collected in this Special Issue provide an impression of the current developments of the matrix isolation technique and its applications to studies of light-induced processes. The editors are grateful to all the authors who contributed to this issue and to the reviewers for their valuable time and dedicated service in the peer-reviewing.

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