Inner shell ionization effects on molecules of biological interest in an aqueous medium

Lucie HUART

(Ligne PLEIADES, Synchrotron SOLEIL, Gif sur Yvette ; NIMBE-LIONS, CEA, Saclay et IMPMC et LCPMR, Sorbonne Université, Paris, France)

THÈSE

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Since the discovery of ionizing radiation (radioactivity, X-rays, charged particles), the chemistry of water remains widely studied as it underlies many fields from nuclear industry to medicine. If interactions start at the atomic level, they have an impact at the molecular level and can affect the behavior of a living organism in the longer term. In order to understand and predict the impact of ionizing radiations, a precise description of the energy deposition in matter is necessary.

Among ionizing events, core-ionizations are usually considered as most energetic events, bringing energy deposition of several hundreds of eV at the scale of an atom. However, they remain poorly described in condensed phase. The aim of this thesis is to use soft X-ray radiation (100 -10 keV) to trigger these K-shell events around different ionization thresholds by irradiating solvated biomolecules. This study first focused on irradiation of pure water, then in the presence of solvated salts to finally investigate the effect on molecules of biological interest. The originality of this multidisciplinary project lies in the association of physico-chemical technics (quantification of radiation-induced damage, development of irradiation devices for low-penetrating radiation) and physical approach (based on electron spectroscopy) to bring a multi-scale description.

Les membres du jury sont :

• Eckart RÜHL,	Professeur (Freie Universität Berlin),	Rapporteur
• Jean-Luc RAVANAT,	Directeur de recherche, HDR (CEA Grenoble),	Rapporteur
• François ROCHET,	Professeur, HDR (Sorbonne Université),	Examinateur
• Sandrine LACOMBE,	Professeure, HDR (Université Paris-Saclay),	Examinatrice
• Sylwia PTASINSKA,	Professeure associée (University of Notre Dame),	Examinatrice
• M.-A. HERVE DU PENHOAT,	Maître de conférence, HDR (Sorbonne Université),	Directrice de thèse
• Jean-Philippe RENAULT,	Chercheur CEA, HDR (CEA Saclay),	Co-encadrant
• Christophe NICOLAS,	Scientifique de ligne (Synchrotron SOLEIL),	Co-encadrant
• Jérôme PALAUDOUX,	Maître de conférence, HDR (Sorbonne Université),	Co-encadrant

Vous êtes cordialement invités au pot qui suivra

Formalités d'entrée : accès libre

SYNCHROTRON SOLEIL
L'Orme des merisiers - Saint-Aubin - BP48 - 91192 GIF S/YVETTE cedex
www.synchrotron-soleil.fr/fr/evenements
CONTACT : sandrine.vasseur@synchrotron-soleil.fr