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Advanced Materials and Processes for Application to the Back-end of the Nuclear Fuel Cycle

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The nuclear industry generates a wide variety of radioactive waste streams during reactor operations and maintenance and in virtually all parts of the fuel cycle. In order to improve the sustainability of the industry it is necessary to develop improved methods and processes for treating, conditioning and disposing of this waste. The talk will provide an overview of research being conducted at the Comisión Nacional de Energía Atómica emphasizing the development of novel solid-extractants with the ability to selectively extract radionuclides from complex solutions and with compositions that facilitate end-of-life management by being able to be converted to extremely stable ceramics. Topics to be covered will include 1) a proposed process for the conversion of spent polymeric ion exchange resins to stable pyropolymer and carbon materials and their subsequent immobilization, 2) synthesis of coordination polymers suitable for the selective extraction of radiolanthanides and their subsequent immobilization, 3) potential new targets for a cleaner production of Mo-99 and 4) the use of phenolic resins as matrices for spent organic and inorganic ion exchange media.

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