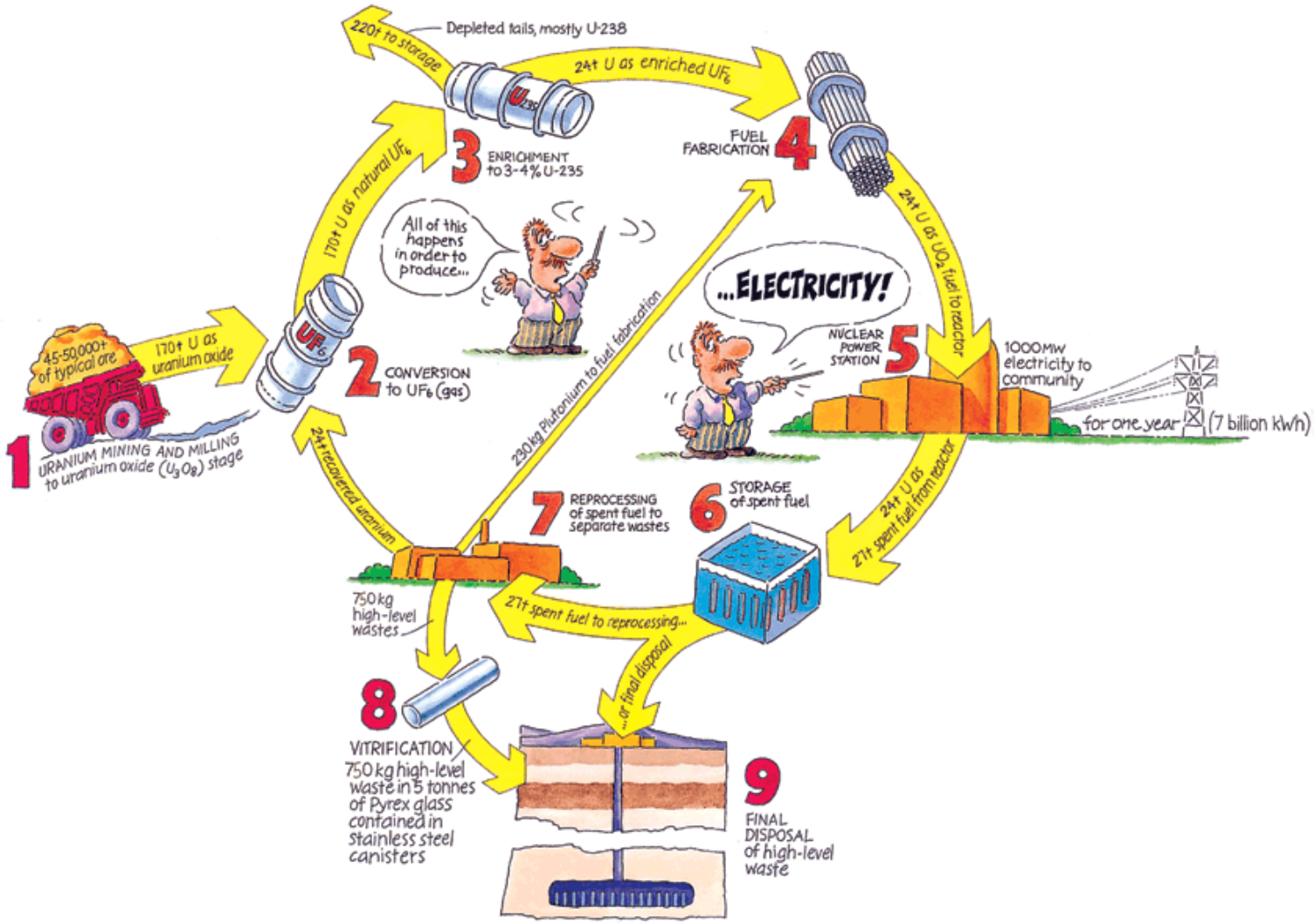
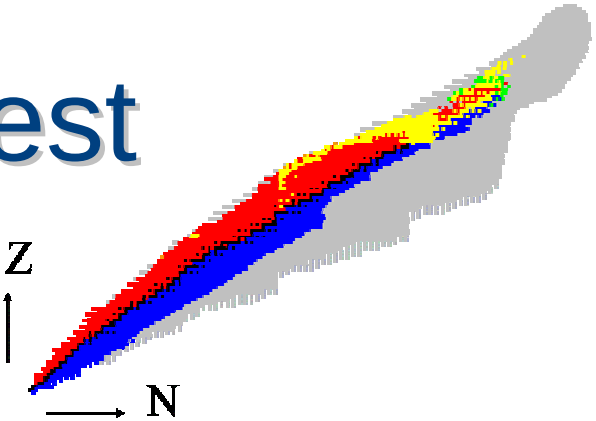
Nuclear Chemical Engineering

(Prof. Mikael Nilsson)



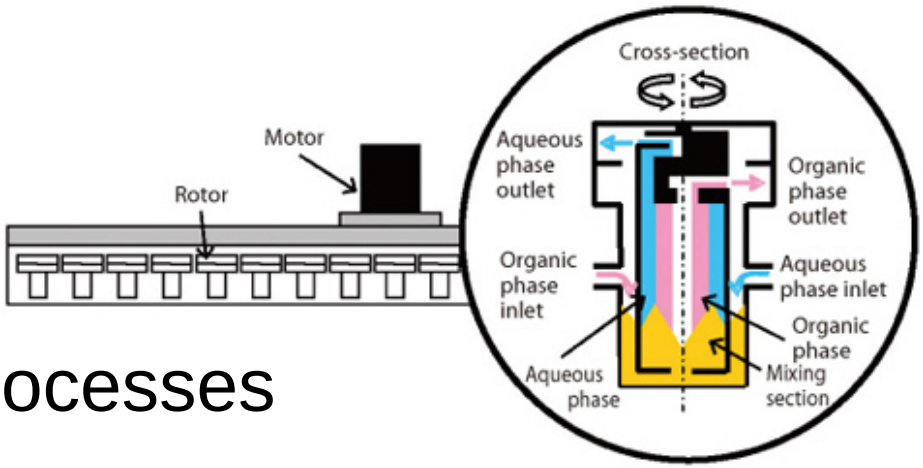
http://www.world-nuclear.org/education/nfc.htm

Areas of interest



oActinide chemistry

oLiquid-liquid extraction



oPilot-scale separation processes

http://jolisfukyu.tokai-sc.jaea.go.jp/fukyu/mirai-en/2006/1_6.html
(JAEA R&D Review 2006, first issue.)

oMethods for hybrid separation systems

Potential projects

- Basic actinide and solvent extraction chemistry

  Basic understanding of the behavior of the heaviest elements in process and a potential repository will be crucial for future nuclear waste reprocessing. Projects include new methods and chemicals used in solvent extraction, pilot processes and flow-sheet development.

- Separation and transmutation

  Fundamental and applied knowledge for separation of different elements in spent nuclear fuel. Radioanalytical techniques and online measurements are instrumental for a successful advanced nuclear fuel cycle.

Potential projects

- Fundamental solution chemistry

  To successfully apply new solvent extraction processes the fundamental understanding of the chemical interactions and physical processes is required. Topics include: chemical interactions such as thermodynamics and kinetics; dispersion of liquid phases in multiphase systems, both experimental and theoretical.

- Analysis and modeling of spent nuclear fuel toxicity and composition

  Close collaboration with the UCI TRIGA reactor opens up possibilities for joint projects in nuclear engineering. Current work involves validation of computer codes for composition and toxicity of spent nuclear fuel and migration and flow of radioisotopes in the environment.