

Contents

List of Abbreviations	ix
List of Reviewers	xv
GIERÉ, R. & STILLE, P. Energy, waste and the environment – a geochemical perspective: introduction	1
The Nuclear Fuel Cycle	
EWING, R. C. Environmental impact of the nuclear fuel cycle	7
HART, K. Reducing the long-term environmental impact of wastes arising from uranium mining	25
STEFANOVSKY, S. V., YUDINTSEV, S. V., GIERÉ, R. & LUMPKIN, G. R. Nuclear waste forms	37
BUCK, E. C., HANSON, B. D. & MCNAMARA, B. K. The geochemical behaviour of Tc, Np and Pu in spent nuclear fuel in an oxidizing environment	65
LUMPKIN, G. R., SMITH, K. L., GIERÉ, R. & WILLIAMS, C. T. Geochemical behaviour of host phases for actinides and fission products in crystalline ceramic nuclear waste forms	89
CROVISIER, J.-L., ADVOCAT, T. & DUSSOSSOY, J. L. Relevance of analogues for long-term prediction	113
GAUTHIER-LAFAYE, F., STILLE, P. & BROS, R. Special cases of natural analogues: The Gabon and Cigar Lake U ore deposits	123
STEINMANN, M. & STILLE, P. Basaltic dykes in evaporites: a natural analogue	135
EIKENBERG, J., BEER, H. & BAJO, S. Anthropogenic radionuclide emissions into the environment	143
The Fossil Fuel Cycle	
GOLOMB, D. S. & FAY, J. A. Atmospheric impact of the fossil fuel cycle	153
YOUNGER, P. L. Environmental impacts of coal mining and associated wastes: a geochemical perspective	169
GLASSER, F. P. Coal combustion wastes: characterization, reuse and disposal	211
TISHMACK, J. K. & BURNS, P. E. The chemistry and mineralogy of coal and coal combustion products	223
GROPPA, J., ROBL, T. & HOWER, J. C. The beneficiation of coal combustion ash	247
SAETHER, O. M., BANKS, D., KIRSO, U., BITYUKOVA, L. & SORLIE, J.-E. The chemistry and mineralogy of waste from retorting and combustion of oil shale	263

SAYLOR, B. Z. & ZERAI, B. Injection and trapping of carbon dioxide in deep saline aquifers	285
The Geothermal Energy Cycle	
ARNÓRSSON, S. Environmental impact of geothermal energy utilization	297
PANICHI, C. Geochemical impact of re-injecting geothermal waste waters: example, Larderello, Italy	337
BALDEYROU-BAILLY, A., SURMA, F. & FRITZ, B. Geophysical and mineralogical impacts of fluid injection in a geothermal system: the Hot Fractured Rock site at Soultz-sous-Forêts, France	355
RYBACH, L. & KOHL, T. Waste heat problems and solutions in geothermal energy	369
The Waste-to-Energy Cycle	
PERRET, D., STILLE, P., CROVISIER, J.-L., SHIELDS, G., MÄDER, U., SCHENK, K. & CHARDONNENS, M. Corrosion and stability of vitrified material derived from municipal solid waste	381
EGGENBERGER, U., SCHENK, K. & MÄDER, U. Chemistry and mineralogy of municipal solid waste incinerator bottom ash	411
BARBIERI, L. & LANCELLOTTI, I. Incinerator waste as secondary raw material: examples of applications in glasses, glass–ceramics and ceramics	423
EIGHMY, T. T. & EUSDEN, J. D., JR. Phosphate stabilization of municipal solid waste combustion residues: geochemical principles	435
GIERÉ, R., LAFREE, S. T., CARLETON, L. E. & TISHMACK, J. K. Environmental impact of energy recovery from waste tyres	475
BANKS, D., SKARPHAGEN, H., WILTSHIRE, R. & JESSOP, C. Heat pumps as a tool for energy recovery from mining wastes	499
Water-Waste Interaction	
BRUNO, J., ARCOS, D., CERA, E., DURO, L. & GRIVÉ, M. Modelling near- and far-field processes in nuclear waste management	515
GECKEIS, H. Colloid influence on the radionuclide migration from a nuclear waste repository	529
DEL NERO, M., FROIDEVAL, A., GAILLARD, C., MIGNOT, G., BARILLON, R., MUNIER, I. & OZGÜMÜS, A. Mechanisms of uranyl sorption	545
THOENEN, T., BERNER, U., CURTI, E., HUMMEL, W. & PEARSON, F. J. Development and application of the Nagra/PSI Chemical Thermodynamic Data Base 01/01	561
ICENHOWER, J. P., SAMSON, S., LÜTTGE, A. & MCGRAIL, B. P. Towards a consistent rate law: glass corrosion kinetics near saturation	579

CONTENTS		vii
JOHNSON, C. A. Cement stabilization of heavy-metal-containing wastes		595
JOHNSON, C. A. & ABBASPOUR, K. C. Hydrological and geochemical factors controlling leachate composition in incinerator ash landfills		607
SPEARS, D. A. & LEE, S. Geochemistry of leachates from coal ash		619
DONAHOE, R. J. Secondary mineral formation in coal combustion byproduct disposal facilities: implications for trace element sequestration		641
INDEX		659