

2. Selection of GIF publications (2020)

General paper

GIF Newsletters nos. 1 to 6, and one Special Summer Edition, available at: www.gen-4.org/gif/jcms/c_122378/newsletters-archive

Lead-cooled fast reactor

Adamov, Ye.O. et al. (2020), "BREST Lead-Cooled Fast Reactor: from the Concept to the Technology Implementation", *Atomic Energy*, v. 129, #4, pp. 185-194.

Afremov, D.A. et al. (2020), "Verification of a CFD-class Software Tool as Applied to Modeling the Fuel Assemblies of Liquid Metal Cooled Reactors", *Thermal Engineering*, 67, pages 509-516, Springer.

Alemberti, A. et al. (2020), "Lead-cooled Fast Reactor (LFR) System Safety Assessment," Generation IV International Forum Report, available at: www.gen-4.org/gif/upload/docs/application/pdf/2020-06/gif_lfr_ssa_june_2020_2020-06-09_17-26-41_202.pdf.

Alemberti, A. et al. (2018), "Status of Generation-IV Lead Fast Reactor Activities", *Proceedings of an International Conference on Fast Reactors and Related Fuel Cycles: Next Generation Nuclear Systems for Sustainable Development (FR17)*, Yekaterinburg, Russian Federation, Paper no. IAEA-CN245-065, IAEA.

Andrianova, O.N. et al. (2020), "Precision neutronic calculations of experiments on the neutron transmission through the reflector layers at the BFS critical facilities for expanding the verification database to justify lead cooled fast reactor designs", *Nuclear Energy and Technology*, Vol. 6(4), pp. 269-274.

Balovnev, A.V. et al. (2020), "System of codes for physical design of the lead-cooled fast reactor", *Problems of Atomic Science and Technology. Series: Nuclear and Reactor Constants*, Issue 3, 3:3.

Frignani, M., Alemberti, A. and Tarantino, M. (2019), "ALFRED: A revised concept to improve pool related thermal-hydraulics", *Nuclear Engineering and Design*, Vol. 355, 110359.

Grachev, A.F. et al. (2020), "Fission Gas Release from Irradiated Uranium-Plutonium Nitride", *Atomic Energy*, Vol. 129, #2, pp. 111-113, Springer.

Hoang V-K., J. Nishiyama and T. Obara (2020), "Effects of compensating for fuel losses during the melt-refining process for a small CANDU reactor", *Annals of Nuclear Energy*, Vol. 135, 106969, Elsevier.

Kwak, J. and H.R. Kim (2020), "Forced Circulation of Lead-Bismuth Eutectic Coolant Using Extra Vessel Electromagnetic Pump for the Non-refueling Full-life Micro Reactor," International Conference on Nuclear Engineering, NUE Conference Papers, American Society of Mechanical Engineering (ASME).

Kawano, N., Y. Tamai, M. Kondo (2020), "Excellent Corrosion Resistance of Tungsten Materials in liquid Tin", *Plasma and Fusion Research*, Rapid Communications, Vol. 15, 1205068.

Kapliencko, A. V. et al. (2020), "Justification of the BREST-OD-300 reactor", *Scientific and Technical Annual Report of NIKIET*, pp. 17-23.

Korostelev, A.B. et al. (2020), "Development of New Structural Materials for Innovative Reactor Facilities", *Atomic Energy*, Vol. 129, No. 4, pp. 233-237, Springer.

Kazuki, K., J. Nishiyama, T. Obara (2020) "Evaluation of Discharged Fuel in Preproposed Breed-and-Burn Reactors from Proliferation, Decay Heat, and Radiotoxicity Aspects", *Nuclear Science and Engineering*, 194(5): 1-9, pp. 405-413, DOI: <https://doi.org/10.1080/00295639.2019.1706322>.

Lee Seung Chul (2020), "Design of Thorium-Fueled Subcritical Reactor Core for TRU Transmutation," MS Thesis, Seoul National University.

Lopatkin, A.V., I.V. Platonov and V.E. Popov (JSC NIKIET) (2020), "Conditions for Achieving Radiation Equivalence of Natural Raw Materials and Long-Lived Radioactive Waste in The Nuclear Power Industry of Russia", *Atomic Energy*, Vol. 129, No. 4, pp. 194-198, Springer.

Orlova, E.E., V.P. Smirnov (JSC NIKIET) (2020), A.E. Vlasenko, A.V. Palagin (IBRAE RAN), "Simulation of Liquid-Metal Flow and Heat Transfer in Experimental Bundles by CELSIST Sub-Channel Code", *Atomic Energy*, Vol. 128, No. 2, pp. 111-113, Springer.

Zhao, Z. et al. (2019), "Conceptual Design of China Lead-Based Mini-Reactor CLEAR-M10d", ANS Annual Meeting, June 9-13, 2019, Minneapolis, US.

Molten salt reactor

Dietz, J. (2020), "Chemical-Thermodynamic Modelling of the MSR-Related Systems Under Normal and Accident Conditions", MSc Thesis, Swiss Federal Institute of Technology, Zurich ETHZ.

Danon, A.E. et al. (2020), "Molten salt corrosion (FLiNaK) of a Ni-Mo-Cr alloy and its welds for application in energy-generation and energy-storage systems". *Corrosion Science*, Vol. 164, March 2020, 108306.

Rodrigo G.G. de Oliveira and B.A. Hombourger (2020), "Fuel tap: a simplified breed-and-burn MSR", *Proc. Physics of Reactors (PHYSOR, 2020)*, Nuclear Energy Group, 1547, Cambridge.

Supercritical-water-cooled reactor

Kassem, S., A. Pucciarelli and W. Ambrosini (forthcoming, 2021), "Insight into a fluid-to-fluid similarity theory for heat transfer at supercritical pressure: results and perspectives", Accepted for publication by the *International Journal of Heat and Mass Transfer*.

Khumsa-Ang, K., S. Rousseau and O. Shiman (2020) "Weight gain and hydrogen absorption in supercritical water at 500°C of chromium-coated zirconium-based alloys: transverse vs longitudinal direction", 10th International Symposium on SCWRs (ISSCWR-10), Prague, the Czech Republic (virtual presentation on 15-19 March 2021).

Kiss A., B. Mervay (2020), "Further Details of a Numerical Analysis on the Thermal Hydraulic Effect of Wrapped Wire Spacers in Fuel Bundle", *Journal of Nuclear Engineering and Radiation Science* 6(3): 031107 (10 pages), Paper No. NERS-19-1069, ASME.

Kiss A. et al. (2020), "About the Thermal Hydraulic Analysis Part of a Coupled Study on a Thorium-Fueled SCWR Concept", *J of Nuclear Rad Sci.* 6(3): 031108 (12 pages), Paper No: NERS-19-1070, ASME.

Lv, H.C. et al. (2020), "Experimental study on heat transfer in vertical cooling tube cooled by downward flow in the passive heat removal system of SCWR", *Applied Thermal Engineering*, Vol. 179:115680, Elsevier.

McLellan, A., X. Huang, M. Gaudet and A. Nava-Dominguez (2021), "Modelling of gravity-assisted loop heat pipe experiments", 10th International Symposium on SCWRs (ISSCWR-10), Prague, the Czech Republic (virtual presentation on 15-19 March 2021).

Musa, A., G. Mazzini, M. Hrehor, M. Ruščák and A. Dambrosio (2020), "Licensing activity and code validation for generation IV SCW technology", *Nuclear Engineering and Design*, Vol. 357, 110424, ISSN 0029-5493, <https://doi.org/10.1016/j.nucengdes.2019.110424>.

Pucciarelli, A., S. He and W. Ambrosini (2020), "A successful local fluid-to-fluid similarity theory for heat transfer to supercritical pressure fluids: merits and limitations", *International Journal of Heat and Mass Transfer*, Vol. 157, 119754.

Pucciarelli, A. and W. Ambrosini (2020), "A successful general fluid-to-fluid similarity theory for heat transfer at supercritical pressure", *International Journal of Heat and Mass Transfer*, Vol. 159, 120152.

Wang, W.S. et al. (2020), "Experimental Investigation on Heat Transfer of Supercritical Water Flowing in the Subchannel with Grid Spacer in Supercritical Water-Cooled Reactor", *Energies*, MDPI, *Open Access Journal*, Vol. 13(5), pp. 1-17.

Very-high-temperature reactor

Aoki, T., H. Sato and H. Ohashi (2020), "Methodology development for Transient Flow Distribution Analysis in High Temperature Gas-cooled Reactor," ICONE2020 (virtual meeting on 4-5 August 2020).

Fütterer, M.A., et al. (2020), "The High Temperature Gas-Cooled Reactor, Reference Module in Earth Systems and Environmental Sciences", Elsevier.

Gougar, H., (2014). *NGNP Program 2013 Status and Path Forward*, INL/EXT-14-31035, Idaho National Laborator

Li, J. et al., "The NUIT code for nuclide inventory calculations", *Annals of Nuclear Energy*, Vol. 148, 1-9, Elsevier.

Liu, B. (2020), "Status and Progress of VHTR FFC in INET", Presented at the 16th meeting of the GIF VHTR FFC PMB, 29-30 September, 2020.

Monaco, F. et al. (2019), "Degradation of Ni-YSZ Electrodes in Solid Oxide Cells: Impact of Polarization and Initial Microstructure on the Ni Evolution", *Journal of the Electrochemical Society*, Vol. 166 (# 15), F1229-F1242.

Myagmarjav, O. et al. (2019), "Comparison of experimental and simulation results on catalytic HI decomposition in a silica-based ceramic membrane reactor", *Int. J. Hydrogen Energy*, Vol. 44, 30832-9.

Xu, A. et al. (2021), "Investigation of mechanical property changes in He²⁺ ion irradiated MA957 through nanoindentation and in-situ micro-tensile testing". *Journal of Nuclear Materials*, Volume 547, 15 April 2021,

Zhang, Y. et al. (2021), "Study on on-line temperature measurement technology for core of pebble bed high temperature gas-cooled reactor", *Nuclear Engineering and Design*, Vol. 371, 1-9, Elsevier.

Zhang, L. et al. (2020), "Influence of graphitization degree of nuclear graphite on HTGR reactor physics calculation", *Annals of Nuclear Energy*, Vol. 143, 1-3, Elsevier.

Economic Modelling Working Group (relevant previous papers)

Mendoza, A., M. Berthelemy and R. Sadhankar (2018), "EMWG Position Paper on the Impact of Increasing Share of Renewables on the Deployment of Generation IV Nuclear Systems", *Proceedings of the 4th Symposium of the Generation IV International Forum, embedded in the Atoms for the Future Conference*, Paris.

Moore, M., R. Sadhankar, A. Korinny and D. Shropshire (2017), "Benchmarking of Nuclear Economics Tools", *Annals of Nuclear Energy*, Vol. 103, pp. 122-129, Elsevier.

Sadhankar, R., L. Sopczak, D. Ryland, R. El-Emam and I. Khamis (2018), "Benchmarking of Economic Models for Nuclear Hydrogen Production", *Proceedings of the Pacific Basin Nuclear Conference*, San Francisco.

"Cost Estimating Guidelines for Generation IV Nuclear Energy Systems" (2007), The Economic Modelling Working Group, available at gen-4.org/gif/.

"Green Bond Principles" at: www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/

"Program on Technology Innovation: Expanding the Concept of Flexibility for Advanced Reactors: Refined Criteria, a Proposed Technology Readiness Scale and Time-Dependent Technical Information Availability", Revision 13, Report No. 3002010479, Electric Power Research Institute.

Proliferation Resistance and Physical Protection Working Group

GIF-PRPPWG, "Proliferation Resistance and Physical Protection Working Group (PRPPWG) Bibliography" (2019), Compiled by the PRPPWG, Revision 7.

Risk and Safety Working Group

GIF RSWG public web page: www.gen-4.org/gif/jcms/c_9366/risk-safety

"Towards a Technology Neutral Nuclear Safety and Regulatory Framework: Applicability of IAEA Safety Standards to SMRs" (Contribution to the IAEA report). See online questionnaire at: www.iaea.org/sites/default/files/20/10/iaea_smr_safety_webinar_presentation_29_october.pdf

Education and Training Working Group

"Gen IV Education and Training Working Group Webinars' Initiative", presented at the virtual American Nuclear Society Winter meeting on 16-19 November 2020, paper No. 32874.

Safety Design Criteria Task Force

"Safety Design Guideline on Safety Approach and Design Conditions", available on the GIF website at: www.gen-4.org/gif/jcms/c_93020/safety-design-criteria.

Advanced Manufacturing and Material Engineering Task Force

Workshop on Advanced Manufacturing, available at: www.gen-4.org/gif/jcms/c_115848/workshop-on-advanced-manufacturing.

Research and Development Task Force

GIF workshop on R&D Infrastructures needs and opportunities, available at: www.gen-4.org/gif/jcms/c_116807/gif-workshop-on-r-d-infrastructures-needs-and-opportunities.

R&D Infrastructure Task Force Final Report, www.gen-4.org/gif/jcms/c_173654/gif-rdtf-final-report-jan2021.