

Contents

Nuclear I&C

- Generation of security system defense strategies based on evolutionary game theory
Bowen Zou, Yongdong Wang, Chunqiang Liu, Mingguang Dai, Qianwen Du, and Xiang Zhu 3463
- Prediction of small-scale leak flow rate in LOCA situations using bidirectional GRU
Hye Seon Jo, Sang Hyun Lee, and Man Gyun Na 3594
- Life prediction of IGBT module for nuclear power plant rod position indicating and rod control system
based on SDAE-LSTM
Zhi Chen, Miaoxin Dai, Jie Liu, Wei Jiang, and Yuan Min 3740

Nuclear Fuel Cycle and Radioactive Waste Management

- Improved FMM for well locations optimization in in-situ leaching areas of sandstone uranium mines
Mingtao Jia, Bosheng Luo, Fang Lu, YiHan Yang, Meifang Chen, Chuanfei Zhang, and Qi Xu 3750
- Understanding the creep behavior of bentonite-sand mixtures as buffer materials in a low-level
radioactive waste repository in Taiwan
Guo-Liang Ren, Wei-Hsing Huang, Hsin-Kai Chou, and Chih-Chung Chung 3884
- Effect of supplementary cementitious materials on the degradation of cement-based barriers in
radioactive waste repository: A case study in Korea
Min-Seok Kim, Sol-Chan Han, and Jong-Il Yun 3942
- Coupled 3D thermal-hydraulic code development for performance assessment of spent nuclear fuel
disposal system
Samuel Park, Nakkyu Chae, Pilhyeon Ju, Seungjin Seo, Richard I. Foster, and Sungyeol Choi 3950
- Material attractiveness of irradiated fuel salts from the Seaborg Compact Molten Salt Reactor
Vaibhav Mishra, Erik Branger, Sophie Grape, Zsolt Elter, and Sorouche Mirmiran 3969

Nuclear Fuel and Reactor Materials

- Titanium alloys: A closer-look at mechanical, gamma-ray, neutron, and transmission properties of
different grade alloys through MCNPcode application
Ghada ALMisned, Omer Guler, Duygu Sen Baykal, G. Kilic, and H.O. Tekin 3501
- Effects of microalloying element addition on mechanical properties of SA508 Gr.1A low-alloy steels
Se-mi Hyun, Min-Chul Kim, Seokmin Hong, Jongmin Kim, and Seok Su Sohn 3528
- Pulse pile-up correction by auto-regression on linear operations (ARLO) method: A comparison with
integration-based algorithms
Mohammad-Reza Mohammadian-Behbahani 3904

Nuclear Physics, Fusion, Laser, and Accelerator Technology

- Conceptual RF design of 750 MHz IH cavities for $\beta = 0.10\text{--}0.15$ ion beams in medical accelerators
Jorge Giner Navarro, Gabriela Moreno, Daniel Gavela, Concepción Oliver, Pedro Calvo, Miguel León,
Ángel Rodríguez, Ricardo López, José Miguel Carmona, and María Alvarado 3536
- Fission counter array for pulse-mode measurements of high-flux and high-energy neutrons
Pilsoo Lee 3553
- The study and design of a deuteron drift tube linear accelerator for middle energy neutron source
Tianhao Wei, Yuanrong Lu, Zhi Wang, Meiyun Han, and Ying Xia 3933

Contents

- Discharge characterization of two-region arc plasma (TRAP) ion source
Kihyun Lee, Seung Ho Jeong, Tae-Seong Kim, Dae-Sik Chang, and Sung-Ryul Huh 3961

Structural Integrity Analysis and Plant Management & Maintenance

- Hybrid vibro-acoustic model reduction for model updating in nuclear power plant pipeline with undetermined boundary conditions
Hyeonah Shin, Seungin Oh, Yongbeom Cho, Jinyoung Kil, Byunyoung Chung, Jinwon Shin, and Jin-Gyun Kim 3491
- An efficient numerical modeling approach for coupled electrical cabinets in nuclear power plants
Sudeep Das Turja, Md. Rajibul Islam, Dong Van Nguyen, and Dookie Kim 3512
- Noticeable localized corrosion of solid boric acid on 304 stainless steel
Xinzhu Li, Wen Sun, and Guiling Ning 3616
- Study on the cantilever ratio optimization of high-temperature molten salt pump for molten salt reactor based on structural integrity
Xing-Chao Shen, Yuan Fu, Jian-Yu Zhang, Jin Yang, and Zhi-Jun Li 3730
- Assessment of environmental fatigue in nuclear power plants: A comparative analysis of the effects of plasticity correction
Tae-Song Han, Hee-Jin Kim, Nam-Su Huh, Hyeong-Yeon Lee, and Changheui Jang 3764

Nuclear Safety

- Extended cognitive reliability and error analysis method for advanced control rooms of nuclear power plants
Xiaodan Zhang, Shengyuan Yan, and Xin Liu 3472
- Real-time measurements and modeling of sodium combustion aerosol dynamics in test chamber to improve the evaluation of SFR containment aerosol behaviour
Usha Pujala, Amit Kumar, Subramanian Venkatesan, Sujatha Pavan Narayanan, and Venkatraman Balasubramanian 3483
- ACE surrogate Model-Based uncertainty and sensitivity analysis methods for severe accident codes
Kwang-Il Ahn 3686
- Identification of primary input parameters affecting evacuation in ventilated main control room through CFAST simulations and application of a machine learning algorithm to replace CFAST model
Sumit Kumar Singh, Jinsoo Bae, Yu Zhang, Saerin Lim, Jongkook Heo, Seoung Bum Kim, and Weon Gyu Shin 3717
- Optimization method for offsite consequence analysis by efficient plume segmentation
Seunghwan Kim and Sung-yeop Kim 3851

Radiation Application

- Optimizing irradiation conditions for natural molybdenum in WWR-K reactor
D.S. Sairanbayev, Sh. Kh. Gizatulin, A.N. Gurin, Ye. T. Chakrova, M.T. Aitkulov, A. Zh. Nessipbay, A. Ch. Ashibayev, and A.A. Shaimerdenov 3566
- Method of the known cross sections for calibration of the fast neutron spectrometer with a single-crystal stilbene based detector
I.V. Urupa, E.V. Ryabeva, R.F. Ibragimov, and V.D. Sapozhnikov 3602

Contents

Study on the behavior of radionuclides in geologic samples from fault zone, Gabal Um Hamd, southwestern Sinai, Egypt Doaa M. El Afandy, Eman M. Ibrahim, Ibrahim E. El Aassy, and H.A. Abdel Ghany.....	3785
Source term inversion of nuclear accidents based on ISAO-SAELM model Dong Xiao, Zixuan Zhang, Jianxin Li, and Yanhua Fu	3914

Radiation protection

Monte Carlo simulation and optimization of neutron ray shielding performance of related materials Tongyan Cui, Faquan Wang, Linhan Bing, Rui Wang, Zhongjian Ma, and Qingxiu Jia	3545
Extensive analysis of several Indian and Yemeni soils' gamma-ray shielding characteristics: An experimental and simulation approach Shamsan S. Obaid, M.I. Sayyed, A.S. Alameen, D.K. Gaikwad, and K.A. Mahmoud	3558
Enhancing X-ray radiation protection with novel liquid silicone rubber composites: A promising alternative to lead aprons Wesam Abdullah, Ramzun M. Ramli, Thair Hussein Khazaalah, Nurul Zahrah Noor Azman, Tasnim M. Nawafleh, and Farah Salem	3608
Evaluating polyester resin as a viable substitute for PMMA in computed tomography dosimetry phantoms A. Khalouqi, A. Halimi, and O. El rhazouani	3758
Studies on structural, optical, thermal and low energy shielding for gamma rays for the ZSBP glasses Abeer S. Altowyan, M.I. Sayyed, and Ashok Kumar.....	3796
Structural, physical, optical, and gamma ray shielding properties of SnO_2 -based boro-silicate glasses: The influence of substituting Na_2O by SnO_2 Mohammad W. Marashdeh, K.A. Mahmoud, Hanan Akhdar, and Mohamed Tharwat	3804
The effect of zinc, iron and manganese content on gamma shielding properties of magnesium-based alloys produced using the powder metallurgy Mesut Ramazan Ekici, Emre Tabar, Gamze Hoşgör, Emrah Bulut, and Ahmet Atasoy.....	3872
The radioactivity levels and beta dose rate assessment from dental ceramic materials in Egypt Mohamed Hasabelnaby, Mohamed Y. Hanfi, Hany El-Gamal, Ahmed H. El Gindy, Mayeen Uddin Khandaker, and Ghada Salaheldin.....	3898
Improvement of internal exposure assessments of the inhalation of fuel-type hot particles during long-term outages Moonhyung Cho and Hyeongjin Kim	3925

Reactor Physics

A new surrogate method for the neutron kinetics calculation of nuclear reactor core transients Xiaoqi Li, Youqi Zheng, Xianan Du, and Bowen Xiao	3571
Study on producing radioisotopes based on fission or radiative capture method in a high flux reactor Wei Xu, Jian Li, and Lei Shi	3585
Uncertainty quantification based on similarity analysis of reactor physics benchmark experiments for SFR using TRU metallic fuel YuGwon Jo, Jaewoon Yoo, Jong-Hyuk Won, and Jae-Yong Lim	3626



An International Journal of the Korean Nuclear Society
NUCLEAR ENGINEERING AND TECHNOLOGY

Volume 56, Number 9, September 2024

Contents

Conceptual design for a 5 kWe space nuclear reactor power system Huaping Mei, Dali Yu, Shengqin Ma, Jiansong Zhang, Yongju Sun, Chao Chen, Meisheng He, Haixia Wang, Yang Li, Liang Wang, Taosheng Li, and Jie Yu.....	3644
Solution of OECD/NEA PWR MOX/UO ₂ benchmark with a high-performance pin-by-pin core calculation code Hyunsik Hong and Jooil Yoon.....	3654
Impact of fuel temperature on nuclear core design calculations Dušan Čalič, Luka Snoj, and Marjan Kromar	3668
Fission source convergence diagnosis in Monte Carlo eigenvalue calculations by skewness and kurtosis estimation methods Ho Jin Park and Seung-Ah Yang.....	3775

Thermal Hydraulics

High fidelity core flow measurement experiment for an advanced research reactor using a real scale mockup Taeil Kim, Yohan Lee, Donkoan Hwang, WooHyun Jung, Nakjun Choi, Seong Seok Chung, Jihun Kim, Jonghark Park, Hyung Min Son, Kiwon Song, Huiyung Kim, and HangJin Jo	3700
Flow-induced vibrations of dual-cylinders in axial flow via LES simulations Kangfei Shi, Yu Cao, Zhanying Zheng, Shun Lu, and Menglong Liu	3812
Implementation of dynamic start-up test experimental data as a main part of the nuclear code validation procedure: Developed RELAP5 model for VVER-1000 Navid Vahman and Reza Akbari	3826
Pebble flow in the HTR-PM reactor core by GPU-DEM simulation: Effect of friction Zuoyi Zhang, Quan Zou, Nan Gui, Bing Xia, Zhiyong Liu, and Xingtuan Yang.....	3835
A study on modeling of boiling heat transfer in core debris bed of SFR Venkateswarlu S., Hemanth Rao E., Prasad Reddy G.V., Sanjay Kumar Das, Ponraju D., and Venkatraman B.....	3864

Corrigendum

Corrigendum to “Preliminary study of artificial intelligence-based fuel-rod pattern analysis of low-quality tomographic image of fuel assembly” [Nucl. Eng. Technol. 54 (10) (2022) 3943–3948] Saerom Sung, Sehwan Choi, Jae Joon Ahn, Hyung-joo Choi, Yong Hyun Chung, Sei Hwan You, Yeon Soo Yeom, Hyun Joon Choi, and Chul Hee Min	3981
--	------

This journal was supported by the Korean Federation of Science and Technology Societies Grant funded by the Korean Government (Ministry of Education).