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atom indonesia

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EDITORIAL

Dear reader, with great pleasure we provide you with the third issue of Atom Indonesia in 2017, namely Volume 43, No.3 (2017). In this issue, we proudly announce a piece of very good news that Atom Indonesia has been indexed by Scopus, so it becomes one of the international journals recognized worldwide. Atom Indonesia has also been indexed by Google Scholar, DOAJ, Crossref, ISJD, and IAEA INIS. Atom Indonesia has provided a Digital Object Identifier (DOI) for each article accepted, so that it can be linked to Crossref. By this indexing, it is expected that Atom Indonesia will become better known among the researchers from around the world and easier to access, thus also increase the impact factor of the journal.

Another important news is that Atom Indonesia has been reaccredited with the highest rank (A) category by both the Ministry of Research, Technology and Higher Education (RISTEKDIKTI), and also by the Indonesian Institute of Science (LIPI) with the numbers of 36b/E/KPT/2016 and 767/AU3/P2MI-LIPI/08/2017, respectively. Additionally, the certificate as an international journal was awarded by the Indonesian Institute of Science (LIPI) starting June 2017 until August 2022. Further information on, and the full articles of, Atom Indonesia Vol.43 No.3 (2017) can be downloaded from http://aij.batan.go.id.

We are glad to inform you that, starting this year, the number of articles per issue has been increased from the previous seven to eight. The Atom Indonesia Vol. 43 No.2 (2017) contains eight articles discussing various applications of nuclear science and technology, ranging from the radioisotopes production, health science, environment, irradiation, nuclear energy, simulation and safety, as well as material science. such as: an assessment of the elemental content, especially heavy metals content, inside human body; a comparative analysis of direct and indirect ^{131}I measurement methods from the stack to outdoor; technetium-99m-labeled diethylcarbamazine citrate (^{99m}Tc-DEC) as a new diagnostic agent for lymphatic filariasis detection; *in vitro* infectivity study of cryopreserved irradiated intraerythrocytic form of *Plasmodium falciparum*; thermal hydraulic modeling of once-through steam generator by two-fluid U-tube steam generator code; effect of cooling fluid flow rate to the critical heat flux and flow stability in the plate-fuel type 2 MW TRIGA reactor; and synthesis and characterization of stoichiometric spinel-$LiMn_2O_4$.

"An Assessment of Heavy Metals on Occupationally Exposed Workers from Hair Analysis" was explored by E. Damastuti, *et al*., from the Center for Applied Nuclear Science and Technology, National Nuclear Energy Agency, Bandung, Indonesia. The use of human hair as a tool in assessing changes and abnormalities in human bodies has been increasing for last decades since it may reflect the health status or environmental condition of habitation or working place of individuals as well as population groups. Compared to other body tissues or fluids, hair provides an ease of elemental analysis especially in reflecting the long-term exposure. This research was conducted to determine the contents of various elements, especially heavy metals since they bioaccumulate in human body organs and impact human health.

"The Comparative Analysis of Direct and Indirect ^{131}I Measurement Methods from the Stack to Outdoor" was written by G. Suhariyono and Bunawas, from the Center for Radiation Safety Technology and Metrology, National Nuclear Energy Agency, Jakarta, Indonesia. The radioisotopes ^{131}I are produced routinely for medical uses in hospitals and pharmacies, in this nuclear facility, and possibly can disperse to the settlements (community) and the environment around the Serpong Nuclear Area. The problem was that there was so far no research and in-depth assessment of the aerial dispersion of ^{131}I radioactivity emitted from the radioisotope production stack to the environment at actual conditions. The research was conducted through simultaneous measurement of ^{131}I radioactivity inside and outdoor of production facility, Serpong Nuclear Area.

"Technetium-99m-Labeled Diethylcarbamazine Citrate (^{99m}Tc-DEC) as a New Diagnostic Agent for Lymphatic Filariasis Detection" was written by N.K. Oekar, *et al*., from the Center for Applied Nuclear Science and Technology, National Nuclear Energy Agency, Bandung, Indonesia, and A. Hanafiah from Indonesian School of Pharmacy, Bandung, Indonesia. Lymphatic filariasis or more commonly known as elephantiasis has infected more than 120 million people in 80 countries, and more than 40 million of them

are unable to work, in addition to disruption of aesthetic values. The problem faced by almost all people in combating this infectious disease is delayed diagnosis. A specific and accurate method of early detection is therefore needed. ^{99m}Tc-labeled diethylcarbamazine-citrate (^{99m}Tc-DEC) has been successfully prepared. However, as part of the discovery and development of new drugs, the fulfillment of pharmaceutical and safety requirements have to be evaluated. Therefore, this research aimed to verify that ^{99m}Tc-DEC met pharmaceutical requirements, and to show that the resulting formula can be used as a diagnostic agent for early detection of filariasis.

"Thermal Hydraulic Modeling of Once-Through Steam Generator by Two-Fluid U-Tube Steam Generator Code" was written by A. Zeighami and M. Rahgoshay from the Department of Nuclear Engineering, Science and Research Branch, Islamic Azad University, Tehran, Iran, under collaboration with M. Khaleghi from Department of Mechanical Engineering, Sirjan University of Technology, Kerman, Iran and M. Hashemi-Tilehnoee from Young Researchers and Elite Club, Aliabad Katoul Branch, Islamic Azad University, Aliabad Katoul, Iran. The THERMIT U-tube steam generator (THERMIT-UTSG) code was used for evaluation for the parametric study of a scaled once-through pressurized water reactor steam generator (OTSG) made by Babcock & Wilcox. The results of the code were compared to the experimental data of the 19-tube OTSG and a simple heat transfer code that was developed by Osakabe.

"Effect of Cooling Fluid Flow Rate to the Critical Heat Flux and Flow Stability in the Plate Fuel Type 2 MW TRIGA Reactor" was explored by H.P. Rahardjo and V. I. Sri Wardhani from Center for Applied Nuclear Science and Technology, National Nuclear Energy Agency, Bandung, Indonesia. Bandung 2 MW TRIGA reactor conversion program replacing the cylindrical fuel (produced by General Atomic) with the plate fuel. The replacement leads into the change of core cooling process from upward natural convection type to downward forced convection type, and resulted in different thermo hydraulic safety criterions, such as Critical Heat Flux limit, boiling limit and cooling fluid flow stability. A thermo hydraulic safety analysis of the converted TRIGA Reactor is presented by considering the Dynamic Nucleate Boiling Ratio criterion, Onset Nucleate Boiling Ratio limit and cooling fluid flow stability at various cooling fluid flow rate.

"Comprehensive Prediction of Thermosyphon Characteristics in Reactor Passive Cooling System Simulation Loop FASSIP-01" was explored by H. Tjahjono from Center for Nuclear Reactor Technology and Safety, National Nuclear Energy Agency, Serpong, Indonesia. Passive cooling mechanism for a nuclear reactor has been proven to be very important since the Fukushima Daiichi Reactor accident that was caused by active cooling system malfunction due to total loss of electrical power source. In the Center for Nuclear Reactor Technology and Safety, National Nuclear Energy Indonesia. The cooling mechanism was studied by using a natural circulation test loop named FASSIP-01. This study aimed to analytically predict the thermal characteristics of the loop including its response time towards steady condition using the MATLAB calculation program.

"*In Vitro* Infectivity Study of Cryopreserved Irradiated Intraerythrocytic Form of *Plasmodium falciparum*" was explored by S. Nurhayati, *et.al*, from Center for Radiation Safety Technology and Metrology, National Nuclear Energy Agency, Jakarta, Indonesia. In control human malaria infection studies using irradiated Plasmodium falciparum, the cell bank of irradiated P. falciparum infected erythrocytes is needed. The cell banking methods represent an obvious way to obtain suitable material for blood stage Plasmodium. In a cell bank development of irradiated Plasmodium infected erythrocytes, the ability to cryopreserve *Plasmodium* is important to recover the infectivity of irradiated *Plasmodium*. This study aims at evaluating the in vitro infectivity of cryopreserved irradiated intra-erythrocytic form of *P. falciparum*.

"Synthesis and Characterization of Stoichiometric Spinel-$LiMn_2O_4$" was written by T.Y.S. Panca Putra, *et.al*., from Center for Science and Technology of Advanced Materials, National Nuclear Energy Agency, Serpong, Indonesia, collaborating with S. Lee from High-Flux Advanced Neutron Application Reactor, Korea Atomic Energy Research Institute (KAERI), South Korea, and T. Kamiyama from High Energy Accelerator Research Organization, Japan. In this study, spinel $LiMn_2O_4$ powder was synthesized from $LiOH.H_2O$ and MnO_x by conventional and mechanical alloying (MA) methods, followed by heat

treatment at 800 °C in O_2 for four hours with cooling to room temperature in the furnace at 60 °C/h. It was found that both samples did not show phase transition in low temperature, and this occurred for different reasons. In the MA sample, the presence of Fe as contamination increased the Mn valence and hindered the occurrence of phase transition.

We continue our tradition of organizing the Atom Indonesia Best Paper Award. This year, it has become the First International Atom Indonesia Best Paper Award 2017. There were more than 30 articles submitted to this annual event. It is our great pleasure to announce the winners, as follows:

- The First Winner is "Synthesis, Structural and Magnetic Properties of $La_{0.5}Ba_{0.5}CoO_{2.75+x}$", which was written by: Zhijian Tan from Department of Materials Structure Science, Sokendai (The Graduate University for Advanced Studies), Japan; Ping Miao, Sanghyun Lee, Shuki Torii from Institute of Materials Structure Science, High Energy Accelerator Research Organization (KEK), Japan; Yoshihisa Ishikawa, Masato Hagihala, Masao Yonemura, Takashi Kamiyama from Department of Materials Structure Science, Sokendai (The Graduate University for Advanced Studies), Japan, and Institute of Materials Structure Science, High Energy Accelerator Research Organization (KEK), Japan; and Taketo Moyoshi from Research Center for Neutron Science and Technology, Comprehensive Research Organization for Science and Society (CROSS), Japan.
- The Second Winner is "Polymorphism of XRCC1 Gene Exon 6 (Arg194Trp) in Relation to Micronucleus Frequencies in Hospital Radiation Workers", which was written by: H.N.E. Surniyantoro, Y. Lusiyanti, T. Rahardjo, D. Tetriana, S. Nurhayati from Center for Technology of Safety and Radiation Metrology, National Nuclear Energy Agency of Indonesia; and Hiroyuki Date from Faculty of Health Sciences, Hokkaido University, Japan.
- The Third Winner is "Nanostructure and Magnetic Field Ordering in Aqueous Fe_3O_4 Ferro fluids: A Small-Angle Neutron Scattering Study" which was written by: A. Taufiq, S. Sunaryono, N. Hidayat from Department of Physics, Faculty of Mathematics and Natural Sciences, Universitas Negeri Malang, Indonesia; E.G.R. Putra from Sekolah Tinggi Teknologi Nuklir, National Nuclear Energy Agency of Indonesia; A. Okazawa from Department of Basic Science, The University of Tokyo, Japan; I. Watanabe from Advanced Meson Science Laboratory, Nishina Center, Japan; N. Kojima from Toyota Physical and Chemical Research Institute, Japan; and S. Pratapa and D. Darminto from Department of Physics, Faculty of Science, Institut Teknologi Sepuluh Nopember, Indonesia.

On behalf of Atom Indonesia, I would like to thank for all of your contributions and endless support that have allowed Atom Indonesia to reach an outstanding performance for all the years. This outstanding achievement could not have been reached without great efforts and cooperation from the editors, reviewers, management personnel, authors, and readers.

Editor in Chief