

5th International Workshop on Accelerator Radiation Induced Activation ARIA19

Summary

September 23-25, IBS-RISP, Daejeon, Korea



ARIA - *History*

ARIA 2008, October 13-17, PSI, Villigen, Switzerland

ARIA 2011, May 15-19, Kibbutz Ma'ale HaChamisha, Israel

ARIA 2015, April 15-17, SNS Oak Ridge, U.S.

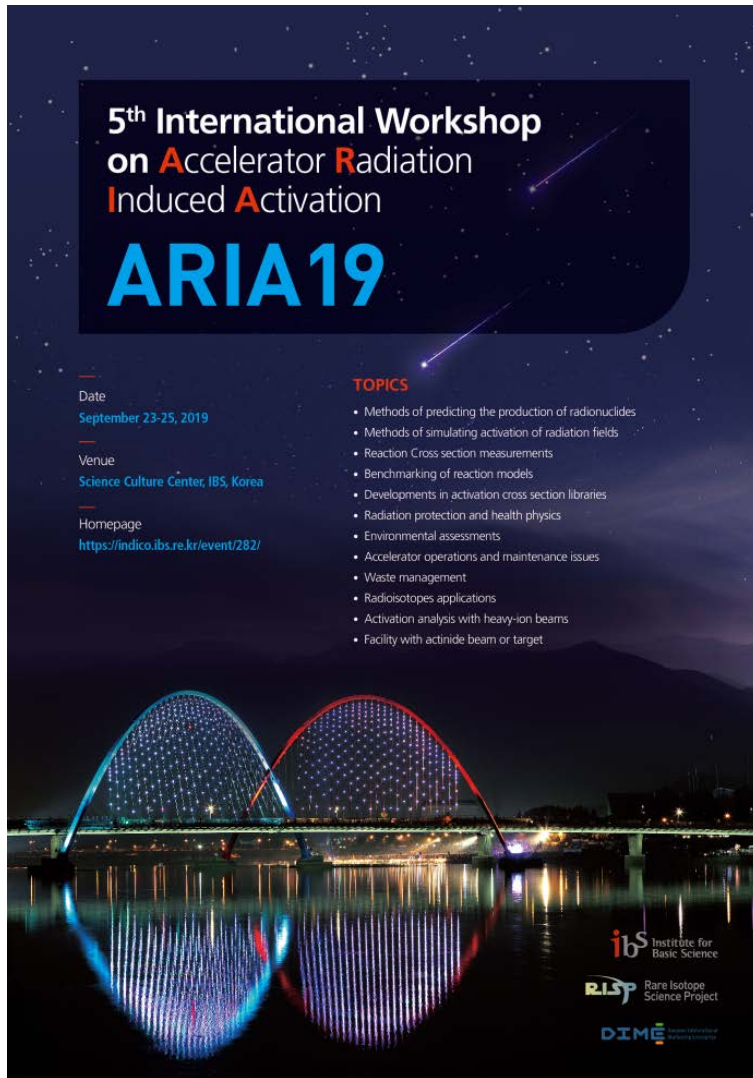
ARIA 2017, May 22-24, ESS, Lund, Sweden

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ARIA – *Main Objectives*

- Promote the ***exchange of information*** among experts in the field of neutron- and accelerator-induced activation, radioactive waste generation, transmutation and burnup, medical isotope production and radionuclide production in accelerator-driven physics facilities, and related topics.
- Identify areas where ***international co-operation*** can be fruitful in order to achieve progress in specific priority areas.

ARIA19



**5th International Workshop
on Accelerator Radiation
Induced Activation**

ARIA19

Date
September 23-25, 2019

Venue
Science Culture Center, IBS, Korea

Homepage
<https://indico.ibs.re.kr/event/282/>

TOPICS

- Methods of predicting the production of radionuclides
- Methods of simulating activation of radiation fields
- Reaction Cross section measurements
- Benchmarking of reaction models
- Developments in activation cross section libraries
- Radiation protection and health physics
- Environmental assessments
- Accelerator operations and maintenance issues
- Waste management
- Radioisotopes applications
- Activation analysis with heavy-ion beams
- Facility with actinide beam or target

ibs Institute for Basic Science
RISP Rare Isotope Science Project
DIME



ARIA19

~26 participants
20 presentations
Stimulating discussions

Main topics

- Waste zoning and characterization studies
- Optimization measures to reduce activation
- Activation benchmark studies
- Activation studies in the design of facilities
- Codes and tools
- Instrumentation

Waste zoning and characterization studies

- Studies for a medical cyclotron decommissioning (Valentin Bonvin)
 - Prediction of concrete activation around 9 accelerator facilities in Japan using ^{24}Na to estimate thermal neutron fluence and production of ^{152}Eu and ^{60}Co (Hiroshi Matsumura)
 - Assessment of activation at electrostatic accelerator facilities to develop decommissioning strategies (Kazuyoshi Masumoto)
 - Assessment of activation around radiotherapy facilities ((Kazuyoshi Masumoto)
 - Assessment of activation around synchrotron radiation facilities (Go Yoshida)
 - Method for characterization of radioactive magnets (Stefan Roesler)
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- Address increasing costs of waste disposal
 - Increased importance to recycling and environmental aspects
 - Modern tools (ActiWiz, RAW) allow comprehensive assessments in efficient way
 - Advance planning of decommissioning
 - Zoning to identify areas with activation below limits to avoid unnecessary waste production

Optimization measures to reduce activation

- Comprehensive analysis of composition of concrete in Japan (Kenichi Kimura)
- Study of shielding materials to cover wall of irradiation room to reduce thermal neutron flux and activation of was (Mahdi Bakhtiari)
 - Importance of optimizing elemental composition of construction material
 - Reduce radiation field components that is likely to cause main radionuclides

Activation benchmark studies

- Benchmark of radiation field around pbar annihilation with Al, Bi, In samples (Angelo Infantino)
- Benchmark of induced activity in different materials at an 9.6 GeV electron accelerator (Nam-suk Jung)
 - Benchmark studies very important in support of both studies for new facilities and decommissioning activities
 - Vital to convince our authorities on correctness of assessments (from studies for new facilities to decommissioning)
 - Important to be able to reduce conservativeness (safety margin) in studies

Activation studies in the design of facilities

- Design of Beam Dump Facility at CERN (Claudia Ahdida)
 - Radiation Protection aspects of Beam Dump Facility prototype tests (Mirko Casolino)
 - Upgrade of SNS to higher power/energy and second target station (Igor Remec)
 - Residual dose rate estimates in RAON ISOL from rare isotope beams (Jae Cheon Kim)
 - Shielding and activation studies for the RAON In Flight Fragment facility (Cheol-woo Lee)
 - Classification of accelerator facilities according to activation risks (Hee-Seock Lee)
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- Importance of detailed assessments to optimize costs and radiological impact
 - Design dictated by activation and decay heat aspects
 - Activation can be indicator abnormal behavior and degradation of components
 - Estimates of radiation risks for rare isotope beams (transport and accumulation) not at all straightforward (several 100 nuclides extracted, transported, lost)
 - Use of different general purpose codes important to confirm and cross-check results
 - Powerful analytical codes (e.g., ActiWiz) now available for fast and comprehensive assessments

Codes and tools

- Update on CINDER2008 and AARE (Igor Remec)
- Tool for calculation of cross sections from gamma spec data (Sung-Kyun Park)
 - Increase user-friendliness
 - Inclusion of accident analysis tool

Instrumentation

- Evaluation of different gamma-ray imaging instruments (Go Yoshida)
 - Able to detect hot spots but nuclide identification more difficult

THANK YOU

to our Local Organizing Committee

Shinwoo Nam (RISP/IBS)
Sangjin Lee (RISP/IBS)
Bum Jon Kim (RISP/IBS)
Kyoungho Tshoo (RISP/IBS)
Jeehyun Cho (RISP/IBS)
Hyung Jin Kim (RISP/IBS)



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See you at

ARIA 2021, spring/summer, in North America