

Title	Experimental study on iodine chemistry (EXSI) – Containment experiments with elemental iodine
Author(s)	T. Kärkelä 1, J. Holm 2, A. Auvinen 1, C. Ekberg 2, H. Glänneskog 3
Affiliation(s)	1 VTT Technical Research Centre of Finland 2 Chalmers University of Technology, Sweden 3 Vattenfall Power Consultant, Sweden
ISBN	978-87-7893-273-0
Date	October 2009
Project	NKS-R / NROI - Nordic research on Radiolytic Oxidation of Iodine
No. of pages	15
No. of tables	2
No. of illustrations	9
No. of references	14

Abstract The behaviour of iodine during a severe accident has been studied in several experimental programs, ranging from the large-scale PHEBUS FP tests and intermediate-scale ThAI tests to numerous separate effect studies. Oxidation of iodine in gas phase has been one of the greatest remaining uncertainties in iodine behaviour during a severe accident.

In this study the possible formation of iodine oxide aerosol due to radiolytic oxidation of gaseous iodine is experimentally tested and the reaction products are analysed. The experimental facility applied in this study is based on the sampling system built at VTT for ISTP program project CHIP conducted IRSN. The experimental facility and the measuring technology are sophisticated and unique in the area of nuclear research as well as in the field of aerosol science.

The results from the experiments show an extensive particle formation when ozone and gaseous iodine react with each other. The formed particles were collected on filters, while gaseous iodine was trapped into bubbler. The particles were iodine oxides and the size of particles was approximately 100 nm. The transport of gaseous iodine through the facility decreased when both gaseous iodine and ozone were fed together into facility.

Experimental study on radiolytic oxidation of iodine was conducted in co-operation between VTT and Chalmers University of Technology as a part of the NKS-R programs.

Key words Iodine, nuclear safety, severe accident, containment, ozone