

17:20 – 17:40 Seung Hwa Yoo
O49 SIMPLE AND EFFECTIVE ROUTE TO FABRICATE LOW-COST CARBON FIBERS USING ELECTRON-BEAM IRRADIATION

18:30 – 20:00 **DINNER**

Session 13: POSTER SESSION

20:00 – 22:00

MAY 29, Wednesday

Session 14: APPLICATIONS OF RADIATION

Chair: Kenji Takahashi

Contributed talks

09:00 – 09:20 Dinara Abbasova
O50 DEVELOPMENT OF RADIATION PROCESSING TECHNOLOGY AND THE ROLE OF IAEA

09:20 – 09:40 Alexander Ponomarev
O51 EFFECT OF BOILING ON THE EXCHANGE AND COMBINATION OF RADICALS IN THE RADIOLYSIS OF OXYGEN-CONTAINING LIQUIDS

09:40 – 10:00 Kasinee Hemvichian
O52 AGRICULTURAL APPLICATIONS OF SUPER WATER ABSORBENT PREPARED FROM RADIATION-INDUCED GRAFTING POLYMERIZATION OF ACRYLIC ACID ONTO CASSAVA STARCH: FROM POT TESTS TO FIELD TESTS

10:00 – 10:20 Katarina Marušić
O53 CROSS-LINKING OF SELF-ASSEMBLED MONOLAYERS OF FATTY ACIDS BY IONISING IRRADIATION FOR CORROSION PROTECTION OF METALS

10:20 – 10:40 Jing Peng
O54 RADIATION-INDUCED FUNCTIONALIZATION OF CELLULOSE MICROSPHERE ADSORBENTS FOR Re/Tc REMOVAL

10:40 – 11:00 **COFFEE BREAK**

Session 15: INTERNATIONAL IRRADIATION ASSOCIATION

Chair: Gustavo H.C. Varca

11:00 – 11:20 Gustavo H.C. Varca
iia: TOWARDS ACADEMIC ENGAGEMENT

Lectures of the iia grantees

11:20 – 11:30 Tamon Kusumoto
O55 A TWO-STEP DEGRADATION PROCESS FOR ORGANIC MOLECULES CONTAINING CARBONATE GROUPS EXPOSED TO LOW-ENERGY ELECTRONS

EFFECT OF BOILING ON THE EXCHANGE AND COMBINATION OF RADICALS IN THE RADIOLYSIS OF OXYGEN-CONTAINING LIQUIDS

A. Ponomarev, S. Vlasov, E. Kholodkova, V. Chulkov, A. Bludenko

Frumkin Institute of Physical Chemistry and Electrochemistry, Russian Academy of Sciences, Moscow, Russia

The boiling state is used both in conventional organic synthesis and in radiation-chemical synthesis, because it provides increased solubility and mobility of reagents, as well as an increased rate of reactions. Accordingly, information on how the reactivity of radiolytic intermediates varies under the boiling conditions of the solvent is very important.

Bubble boiling refers to the extreme states of a liquid and consists in intense vaporization both in the volume of the liquid and on its surface. Boiling is accompanied by mass transfer of vapor bubbles, which provides a rather efficient mixing of the irradiated system. At the same time, the boiling state maximally relieves the molecules of intermolecular attraction forces, including hydrogen bonds. In the process of boiling the liquid molecules acquire the greatest mobility and elasticity. Under irradiation, the boiling substance is continuously depleted in light radiolysis products and, accordingly, is enriched in the heaviest products. All these factors can provide a significant difference between the radiolysis of boiling liquid and its radiolysis in an unheated state.

The radiation-chemical yields of molecular products of electron beam radiolysis of diglyme, n-propanol, acetone, 2-butanone, and 4-methyl-2-pentanone in boiling and unheated states are measured and discussed in the present work.

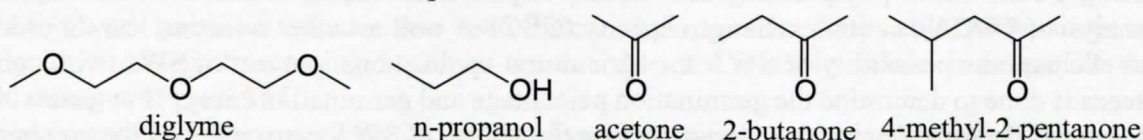


Figure 1. Investigated compounds.

Only molecular products of the first generation, which appear already at low absorbed doses and whose content increases monotonically with the dose, are considered. Ionization is a key radiolytic process and, accordingly, the formation and neutralization of cations and anions play a key role in the primary stage of radiolysis. Ionic processes in the studied solvents are completed much faster than radical processes, which gives reason to consider the observed range of end products, primarily from the point of view of the effect of temperature on the reactivity of radicals.

The present study shows that the boiling state provokes dissociation of certain intermediates, increases the yield of solvent degradation, enhances the exchange and combination of radicals, while the relative role of the processes of radical disproportion is reduced.