by the prism with Ag_4^{3+} inside, close to two octagonal windows of the prism. Four other NH_3 molecules are located in four further α-cages interacting with the tetramer through square windows. Schematically our model is presented in Fig.3.

Conclusions

Based on the EPR results it is postulated that the Ag_4^{3+} clusters in AgCs-rho zeolite exposed to NH_3 are formed directly during radiolysis at 77 K by trapping electron by the arrangements of $4Ag^+$ in the same octagonal prism. This mechanism is unlike to the gradual silver agglomeration is dehydrated AgCs-rho, which requires migration of silver atoms and cations to produce Ag_4^{3+}. The decrease of Ag_4^{3+} hyperfine splitting from 13.9 mT in dehydrated zeolite to 10.7 mT in zeolite exposed to ammonia indicates a strong interaction with NH_3 molecules.

The formation of multicore $Ag_4^{3+}(NH_3)_n$ complex was proved univocally by the presence of superhyperfine pattern on the Ag_4^{3+} lines. The number of superhyperfine lines is different for zeolites exposed to $^{14}NH_3$ and $^{15}NH_3$. The best simulation of ^{14}N and ^{15}N superhyperfine patterns were obtained assuming the interaction with the two close nitrogen nuclei and the four distant ones. Matching ligand configuration to the zeolite structure, we postulated that the Ag_4^{3+} cluster in the octagonal prism coordinates through octagonal windows two close NH_3 molecules in the nearest α-cages. Four further ammonia molecules are placed in the next--neighboring α-cages interacting with the tetramer through square windows.

The $Ag_4^{3+}(NH_3)_2'(NH_3)_4''$ complex is also formed when ammonia is adsorbed on dehydrated zeolite with Ag_4^{3+} clusters already produced by irradiation indicating that the silver tetramer is located in the site accessible for adsorbates.

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A NANOSECOND PULSE RADIOLYSIS SYSTEM DEDICATED TO THE NEW LAE 10 ACCELERATOR IN THE INCT

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Pulse radiolysis is an invaluable tool for studying the kinetics and spectra of transient chemical species. This method has found a broad range of important applications in chemistry and biochemistry, extending far beyond the scope of radiation chemistry to which it was first applied [1].

With the advent of microprocessors all aspects of the generalized experiment are susceptible to computer control. In this report we describe a computer--controlled pulse radiolysis system based on a fast digital storage oscilloscope (DSO) [2,3]. The oscilloscope produces a sufficient number of time points that multiple time scales can be generated by the computer from a single kinetic trace originating from DSO. Thus, one can in principle, with a single kinetic trace, resolve time constants from a few nanoseconds to tens, or even hundreds of microseconds. The simultaneous recording transient absorption data on multiple time scales is valuable for saving both experimental time and the amount of valuable samples.

The measurement room, with an accelerator gun, an analytical light source lamp, a dose meter and other devices, is separated from the operator room by a shielding wall and fiber optic connectors used for noise interference minimization (Fig.1). Analytical light, after passing the measurement cell, periscope and monochromator SpectraPro-275 (controlled by the host PC) is converted to electric current signal in a photomultiplier Hamamatsu R-955. The signal, after subtraction of the reference light and signal amplification (DI) (1, 10 or 100x), is measured by a LeCroy 9354AL oscilloscope. Other analog signals (reference light-I0 and dose monitor) are measured using AD converters in ADAM modules (Advantech).

All peripherals are connected to a host computer (PC) using two types of interfaces: a GPiB-parallel bus and RS232/RS485 serial buses with an optical isolation. The fast oscilloscope LeCroy 9354AL is connected to the PC using the parallel bus GPiB. This bus is also used for connecting an HV Power Supply PS310 (not shown in Fig.1). Other peripherals are connected to the PC using a single RS485 serial communication port.

Digital signals, pre-trigger, dose strobe, reference light strobe, are sent from the host computer to target elements using digital (open collector) outputs through specialized ADAM modules. The pre-trigger pulse is sent to the accelerator using fiber optic connections. The trigger signal from the accelerator, after passing through fiber optics and converters, is sent to the LeCroy 9354AL oscilloscope. The monochromator, equipped with RS232 interface, is connected to the host PC using the ADAM 4521 addressable module that converts RS485 standard to RS232 standard. The program RD2000, which controls pulse radiolysis setup, works under Windows 9X/NT operating system. This program was created using Delphi 3.0 (Borland) Pascal type programming tools.

The Operator Desktop (Fig.2) consists of five sub-windows:

- One-Shot Data, for the actual measured kinetics (not shown);
- Final Data, for the averaged data, which are displayed after each accelerator shot at a selected wavelength;

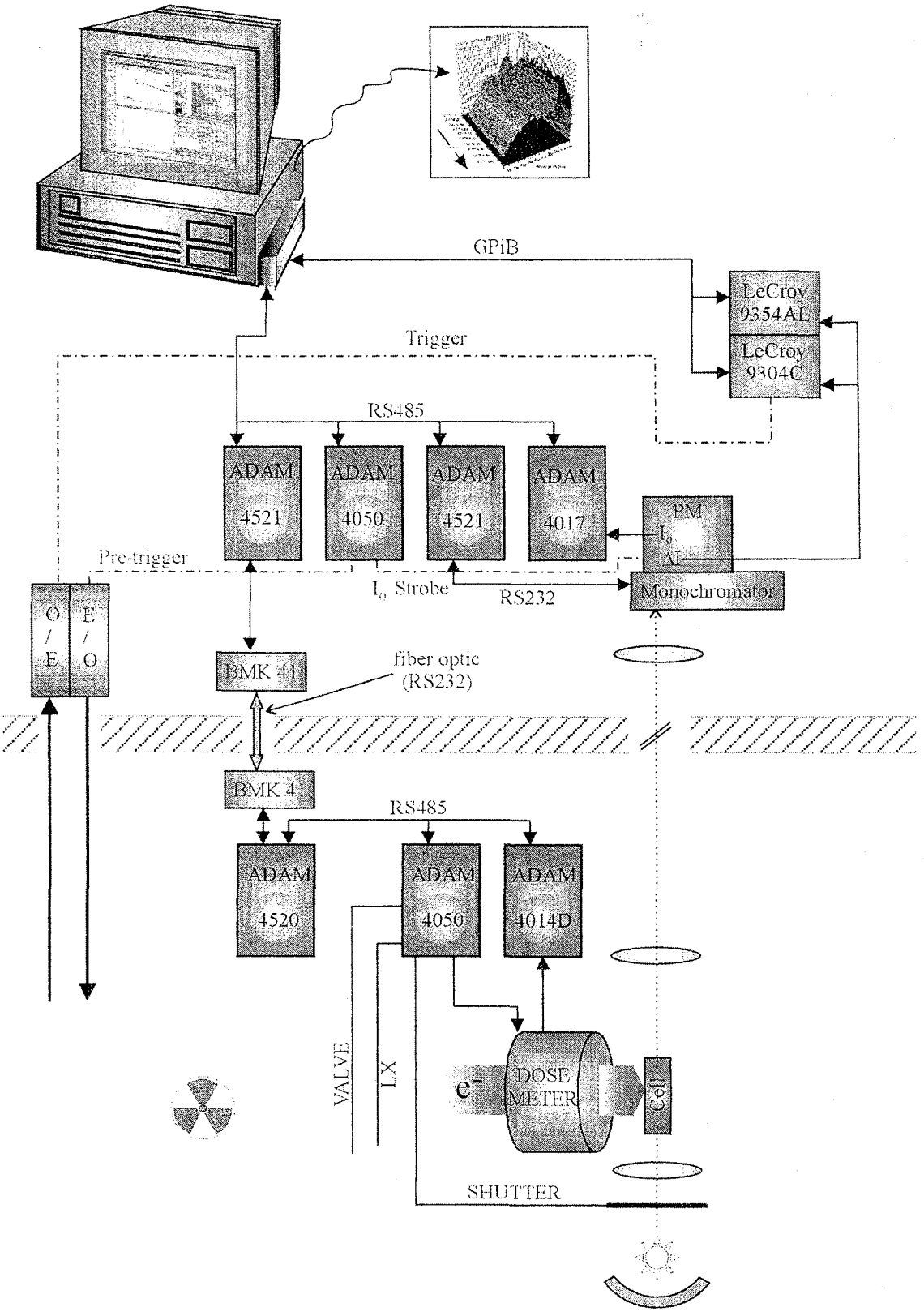

Fig.1. Schematic diagram of the pulse radiolysis system operated in this Institute: design of experimental control functions (computer and control circuits).

- D3Form, for the kinetics vs. wavelength mapping;
- Spectral Data, for the spectrum obtained from the averaged kinetics data, at the selected time;
- Monochromator, for controlling of data transfer from/to peripherals connected to the serial port.

This window is used in the case of emergency, and normally is not shown on the operator desktop.

Oscilloscope Dialog window pages are dedicated to the communication with GPiB peripherals: LeCroy 9354 and HV Power Supply PS310. The operator has several options: changing active channel

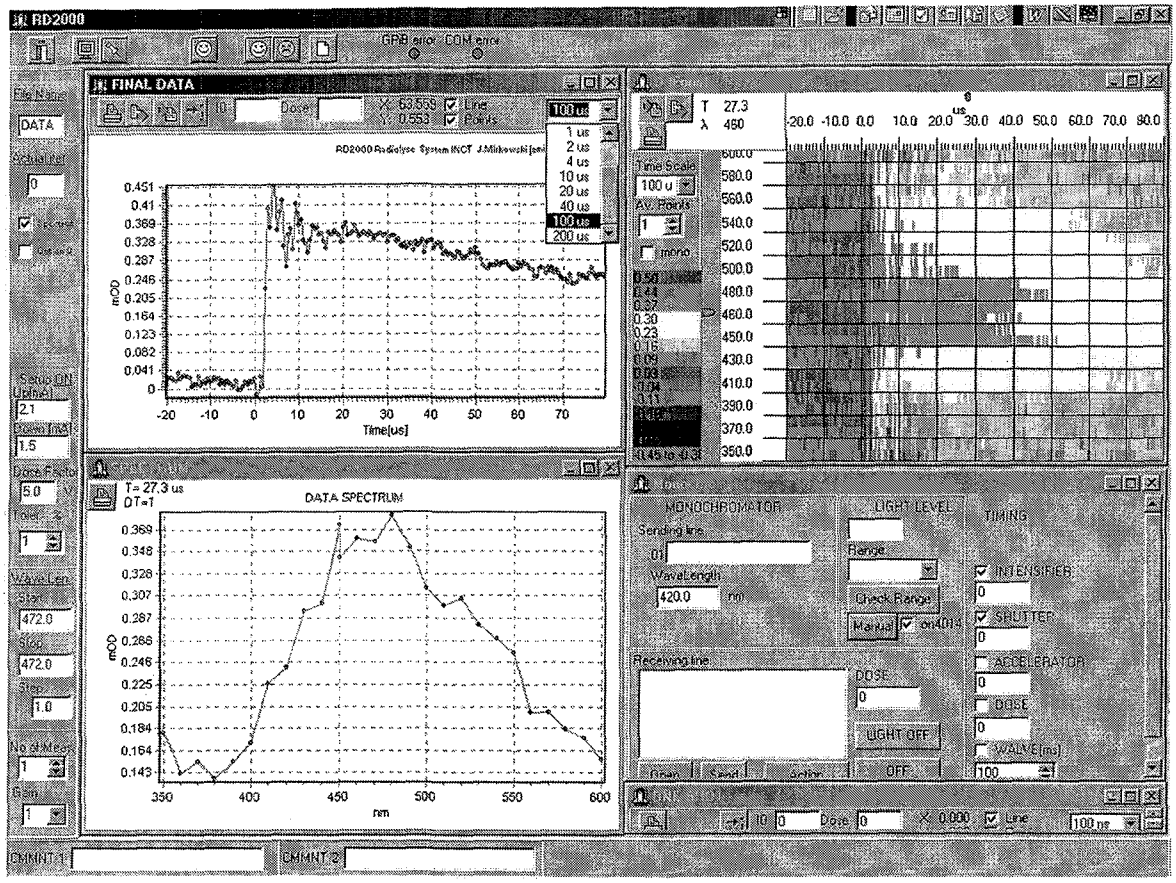

Fig.2. General view of the operator desktop after data collection.

parameters, trigger parameters and active buffer parameters. The active buffer parameters are used for positioning the front of the electron pulse accurately at the 20% time scale position point. In the current version, the buffer length and the time scale are fixed parameters.

The Final Data window shows an unwrapped box with optional values of the time scale parameter for the displayed kinetics. In the current version the system collects data on 11 time domains: starting from 100 ns and ending on 200 ms. All kinetics are stored in 200-points data buffer per each time domain.

The operator can choose independently any time scale for each window, i.e. One Shot Data, Final Data, D3Form1. Data, in the Data Spectrum Window, are displayed accordingly with the position of the horizontal marker (time positioning) on mapped data.

The current version of the pulse system (without light pulser) allows measurements of the optical density in the range of tenths of mOD.

Experimental data are collected and stored in standard formats (e.g. DBF) easily accessible by common programs (Lotus, Excel, Origin, Access etc.).

The new pulse radiolysis system, due to its modular structure and applied programming tools, is very flexible, adopted easily to all changes, and friendly for the users.

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POST-IMPLANTATION DEFECTS. INSTABILITY UNDER 1 MeV ELECTRON IRRADIATION IN GaAs

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One of the main drawbacks of ion implantation into semiconductor crystals is generation of lattice damage which deteriorates their physical parameters. Therefore, it is necessary to remove post-implantation defects in order to activate the implanted impurities and to obtain the desired electrical activity of the crystal.