

P14.1 Summary Talk – Sessions A

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Sessions Statistics – Sessions A

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(only for session A)

⇒ Session of New Equipment & Defects

Methodical Improvements / New Installations

New Installations

- Doyama: transmission positron microscopes (pictures of different objects shown on image plates)
- KEK: microprobe using LINAC $\rightarrow 10^6$ e⁺/s and 0.1 mm are expected; transmission moderators
- AIST: 2-generation pulsed beam with own LINAC (>5kW); 50kHz pulse repetition; after first Buncher 10^8 /s; after focusing 10^6 /s @ $1\mu\text{m}$
- EPOS: starts with 5 ps e⁺ bunches; remote controlled; Multi-detector system; fully digital
- WSU: Deuteron accelerator converts C to ¹³N (10 min halflife)
- APosS: Argonne Positron source; uses LLNL equipment; 15 MeV @ 0.2 mA; also experiments from LLNL: holography + microprobe

- NEPOMUC: at FRM-II in Munich most universal and strongest source so far available; 2 PAES spectrometers; CDBS; Ps⁻ experiment; SPM; PLEPS; about 10⁸ e⁺/s after first re-moderation
- PULSTAR reactor: University reactor centre; 1MW power; positron source by North Carolina State Univ, Univ. of Michigan, ORNL; 6x10⁸ e⁺/s expected; e⁺ and Ps spectrometer; Cd converter & W moderator

Methodical Improvements / New Installations

Methodical improvements

- Gaussian analysis of DB-curves shows depth distribution of different annihilation sites
- Enhanced-depth resolution profiling
- S-W-plot used in quantitative manner for defect profiling (only one defect type)

Defects in Semiconductors / Isolators

- Decorated vacancy clusters in **Si** after He-implantation; decoration found by CDBS and lifetime (2 talks)
- Monovacancies in ion-implanted **Si**
- thermally generated vacancy-donor complexes in **highly-doped Si**
- defects already before in virgin **ZnO** and after N-implantation (built-in H); implanted impurities (B, Al) trap O_i and stabilize V_o
- proton bombarded **6H-SiC**: annealing stages of vacancies discussed
- **UO₂**: long-term fuel; electron and He irradiation study
- defects in **diamond**
- **CdTe** films on different substrates
- 2D-ACAR study of **porous Si**
- nano-pore formation in **silica PECVD** films

Defects in metals and alloys

Al alloys

- two talks: role of vacancies during precipitation (formation of GPZ)
- CDBS + PALS study of Aluminum 2037 cast alloy (AlCuMgMn)

Others

- n-irradiated **Fe** and **Fe-Cu** (in coincidence setup); clustering of Cu and vacancies observed
- alloys for RPV **steel** and fission/fusion technology (PLEPS)
- **H-loaded Nb** (bulk and film: H-induced vacancies; comparison with theory: 4 vacancies at a vacancy; loading/unloading experiments)
- **Cu-Zr** amorphisation by repeated folding & rolling
- **Fe-Al** order-disorder transition; structural vacancies observed
- phase-transition induced vacancies in metals and alloys

Nano-Materials

- 2D-ACAR study of surfaces of nano-crystals
- ZnS - MnS nano-particles
- GPZ in Al and Fe alloys are nano-particles
- nanoporous material (low-K ...)

Theory

- First-principle calculations of PA characteristics in solids
- calculation of momentum distribution (PAW method: accurate and reliable)
- many-body effects seen in PA
- SIESTA code

Positron-induced Auger effect

- progress was made in PAES (Se layers on Si; TOF spectrum of Cu_2O)
- new setup at FRM-II Munich starts operation: Auger yield orders of magnitude higher compared to AES
- second spectrometer at FRM-II: TOF setup ready for use

Conclusion

- defects in metals / Semiconductors still important
- nano-materials are important issue
- new experimental installations and theoretical improvements will give new possibilities
- network with other positron methods and corresponding methods needed

Photos of social events available:

http://www.krauserehberg.de/ICPA-14_Photos/

please send me your photos to be included in this website