P14.1 Summary Talk – Sessions A

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- Sessions Statistics
- Details
# Sessions Statistics – Sessions A

<table>
<thead>
<tr>
<th>Topic</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methodical improvements/New Installations</td>
<td>12</td>
</tr>
<tr>
<td>Defects in Semiconductors/Isolators</td>
<td>11</td>
</tr>
<tr>
<td>Defects in Metals/Alloys</td>
<td>9</td>
</tr>
<tr>
<td>Theory</td>
<td>4</td>
</tr>
<tr>
<td>PAES</td>
<td>3</td>
</tr>
<tr>
<td>2D-ACAR</td>
<td>3</td>
</tr>
</tbody>
</table>

(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 -> $10^6$ 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 @ 1µm
- EPOS: starts with 5 ps e+ bunches; remote controlled; Multi-detector system; fully digital
- WSU: Deuteron accelerator converts C to 13-N (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 $10^8$ e+/s after first re-moderation

• PULSTAR reactor: University reactor centre; 1MW power; positron source by North Carolina State Univ, Univ. of Michigan, ORNL; $6 \times 10^8$ e+/s expected; e+ and Ps spectrometer; Cd converter & W moderator
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
- UO_2: 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 ...)

Martin-Luther-Universität Halle
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$_2$O)
- 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