

JOURNAL OF PLASMA AND FUSION RESEARCH

The Journal of the Japan Society of Plasma Science and Nuclear Fusion Research
Vol. 85, No.8, August 2009

Special Contributed Article

- Recollections on the Progress in Fusion Research over the Past Fifty Years IIYOSHI Atsuo, MUTOH Takashi and YOKOYAMA Masayuki 487

Commentary

- Frontiers of Plasma Technology for High-Efficiency Silicon Based Solar Cells and Their Mass Production KONDO Michio, FUJIWARA Hiroyuki and SAITO Tadashi 499

Special Topic Article

- Advances in Plasma Research at Ultra-Low Temperature
1. Introduction ISHIHARA Osamu 509
2. Complex Plasmas in Cryogenic Environment ISHIHARA Osamu 511
3. Laser Cooled Plasma in RF Trap ARAMAKI Mitsutoshi, KAMEYAMA Satoshi and KONO Akihiro 520
4. Characteristics and Self-Organization of Plasmas at Cryogenic Temperatures NOMA Yuri, CHOI Jai Hyuk, SANO Masaki and TERASHIMA Kazuo 526
5. Synthesis of Nanomaterials Using Plasma Reaction in Cold Liquid SANO Noriaki 532

Special Topic Article

- Heat Removal Technologies in Fusion Reactor — from Actual Uses to Advanced Technologies —
1. Introduction TODA Saburo and EBARA Shinji 539
2. The Foundation of Thermal and Fluid Engineering in Nuclear Fusion Reactors
 2.1 Cooling of Plasma Facing Components EZATO Koichiro 540
 2.2 Heat Transfer Fluids in Fusion Blankets SEKI Yohji, EZATO Koichiro and ENOEDA Mikio 543
3. Actual Thermofluid Engineering in Fusion Devices
 3.1 Cooling of Plasma-Facing Components of ITER, JT-60SA EZATO Koichiro 548
 3.2 Thermofluids in Test Blanket Modules of ITER SEKI Yohji and ENOEDA Mikio 551
4. Front Line of Fusion-Related Thermofluid Researches
 4.1 MHD Turbulent and Buoyant Flow in Fusion Blankets SMOLENTSEV Sergey 556
 4.2 Extremely High Heat Flux Removal Technique Using Metal Porous Media YUKI Kazuhisa 558
 4.3 Thermofluid Engineering in Conceptual Design of Helical Reactor
 — Heat Transfer in Self-Cooled Flibe Blanket SAGARA Akio and HASHIZUME Hidetoshi 561
 4.4 Temperature Control of IFMIF High Flux Test Module EBARA Shinji 564
5. Conclusion TODA Saburo and EBARA Shinji 567
- PFR Abstracts 569
- Information 571
- Plasma & Fusion Calendar 572
- Announcement 575

Cover

Dust particles collected in LHD by a vacuum-filtered collection method. Dust particles are classified into three kinds: (a) and (b) show small spherical dust particles below 1 μm in size, (c) shows an agglomerate consisting of primary particles of 10 nm, and (d) shows a large dust particle above 1 μm in size and irregular in shape; this suggests three formation mechanisms of dust particles: chemical vapor deposition growth, agglomeration, and peeling from walls. (Kazunori KOGA *et al.*, Plasma and Fusion Research Vol.4, 034 (2009) <http://www.jspf.or.jp/PFR/>)

Published Monthly by

The Japan Society of Plasma Science and Nuclear Fusion Research

3-1-1, Uchiyama, Chikusa-ku, Nagoya 464-0075, Japan

Tel 052-735-3185, Fax 052-735-3485, E-mail: plasma@jspf.or.jp, URL: <http://www.jspf.or.jp/>