

2nd circular for the international symposium in Matsuyama on:

Science and Technology of Nano-Polycrystalline Diamond 2019 (STNPD-2019)

24 January 2019

Scope: Since the first report of synthesis of ultra-hard nano-polycrystalline diamond (NPD) in 2003 by the Geodynamics Research Center (GRC) of Ehime University, efforts have been made to apply this novel material to cutting-edge high-pressure researches in geoscience, physics, chemistry, materials science, etc., through a number of inter-laboratory collaborations with the GRC. We will have an international symposium on the synthesis, physical properties, and applications of NPD and relevant materials for further development of science and technology in high-pressure and related research fields, as well as for promotion of research collaborations using NPD. We invite not only the NPD users but also those who are interested in using NPD for their individual studies to this first international symposium on science and technology of NPD to be held at the GRC in Matsuyama, where it was born. This symposium is supported by the Joint Usage/Research Center program (“PRIUS”) run by the GRC and the Grant-in-aid for Scientific Research in Innovative Areas (“Interaction and Coevolution of the Core and Mantle”).

Venue: Geodynamics Research Center, Ehime University, Matsuyama, Japan
(30 min. from Matsuyama airport by taxi or 50 min. by bus + tram;
<http://www.grc.ehime-u.ac.jp/en/about/access>).

Date: 28 February - 2 March 2019 (subsequent to the “PRIUS symposium”, mostly given in Japanese, 27-28 February).

Deadlines for contributed papers/posters and registration: 15 December 2018 (extended to 15 February 2019 for contributed poster presentation and registration).

Registration fee: Free of charge.

Banquet: 5000 yen (on-site payment at the registration desk, cash only).

Unofficial Dinner: “Ginjiro” near Ohkaido, on-site payment (about 5000 yen, cash only) at the restaurant.

Excursion to Uchiko-town: 5000 yen (on-site payment at the registration desk, cash only; including bus fair, lunch, drink).

Presentation: All oral speakers are invited (30 minutes for keynote and 20 minutes for

other invited papers). Posters (should be prepared in English) shall be displayed throughout the whole period of the symposium for presentation/discussion. The poster should be in A0 size (about 90 cm X 120 cm), vertical.

Accommodation: Many hotels are located in walking distance (15-20 minutes) from the GRC in the famous Dogo onsen area and the Ohkaido downtown area. We already reserved single-bed rooms from 27 Feb. to 3 March for 4 nights at Daiwa Roynet Hotel (<https://www.daiwaroynet.jp/matsuyama/>) near the entrance of Ohkaido for only invited speakers.

Organizing Committee: Tetsuo Irifune (Chair), Hiroaki Ohfuji, Yoshio Kono, Fumitaro Ishikawa, Takeshi Sakai, Masayuki Nishi, Toru Shinmei, Akira Yamada (GRC members).

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Program for oral sessions

[28 February]

13:30-15:00

1. Synthesis of NPD and related materials (Chair: H. Ohfuji)

KEYNOTE: Tetsuo Irifune (GRC, Ehime Univ.)

“Synthesis, characterization, and application of NPD: An overview”

Masayuki Nishi (GRC, Ehime Univ.)

“Polycrystalline diamond sintered from ultradispersed nanodiamonds”

Nico A. Gaida (Fac. Eng., Nagoya Univ.)

“Transparent nanoceramics composed of birefringent crystals”

Norimasa Nishiyama (MSL, Tokyo Inst. Tech.)

“Fabrication of transparent polycrystalline cubic silicon nitride and its physical properties”

15:00-15:50

Break & Poster

15:50-17:40

2. Features and physical properties (Chair: N. Nishiyama)

KEYNOTE: Yanbin Wang (GSECARS, Univ. Chicago)

“The strength and plastic deformation of NPD”

Tsutomu Mashimo (Inst. Pulsed Power Sci., Kumamoto Univ.)

“Shock-compression behavior and strength of diamond”

Hiroaki Ohfuji (GRC, Ehime Univ.)

“Microstructure and crystallization mechanism of synthetic and natural NPDs”

Angelika Rosa (Mat. Extreme Cond., ESRF)

“NPD: a key device for high quality XAS at extreme P/T conditions”

Fumitaro Ishikawa (Fac. Eng. & GRC, Ehime Univ.)

“Impurity doping for electronic carrier control of diamond using high pressure and high temperature technique”

17:40-18:20

Lab tour

18:30-20:30

Banquet: University cafeteria

[1 March]

8:30-10:00

3. Applications to ultrahigh pressure generation (Chair: Y. Wang)

KEYNOTE: Takehiko Yagi (GCRC, Univ. Tokyo)

“Ultra-high pressure generation using double stage diamond anvil technique and the properties of nano polycrystalline diamond”

Takeshi Sakai (GRC, Ehime Univ.)

“Equations of state at multi-megabar pressure”

Katsuya Shimizu (Kyokugen, Osaka Univ.)

“Mbar-superconductivity and NPD”

Florent Occelli (CEA)

“A new diamond anvil tip geometry aimed at reaching multi-Mbar pressures”

10:00-10:30

Break

10:30-12:00

4. Applications to X-ray spectroscopy under pressure (Chair: Y. Kono)

KEYNOTE: Max Wilke (Inst. Earth & Environ., Univ. Potsdam)

“Using Nanopolycrystalline Diamonds for EXAFS on glass and melt at extreme conditions”

Naoki Ishimatsu (Fac. Sci., Hiroshima Univ.)

“Element-selective local structure studied by X-ray absorption spectroscopy using NPD anvils”

Saori Kawaguchi (JASRI, SPring-8)

“Structure determination of liquid Fe-Ni-S alloys at high pressure”

Christele Sanloup (IMPMC, Sorbonne Université)

“Incorporation of trace elements in magmas at depth”

12:00-13:00

Lunch (business meeting?)

13:00-14:10

5. Applications to other high-pressure studies (Chair: N. Ishimatsu)

KEYNOTE: Yoshio Takano (NIMS)

“Exploration of pressure induced superconductors using materials informatics”

Longjian Xie (BGI, Univ. Bayreuth)

“Boron-doped diamond in multi-anvil apparatus and its implication for in-situ falling

sphere viscometry”

Hiroshi Fukui (Fac. Sci., Univ. Hyogo Pref.)

“NPD applied to X-ray Raman Scattering and suggestions to improve the usability”

14:10-15:00

Break & Poster

15:00-18:30

A visit to Matsuyama castle hill: ~30 minute-walking from GRC, visiting the castle tower on the top of the hill. Another option is to visit the Museum of Ehime Univ. on the campus, about 5 minutes from the GRC, where some NPD products are being displayed, including brilliant-cut NPD with a diameter of 1 cm and NPD with perfectly spherical shape of 7 mm diameter.

19:00-

Unofficial dinner: “Ginjiro”, serving local cuisine of Ehime (near the Daiwa Roynet Hotel), about 5000 yen.

[2 March]

9:00-10:30

6. New ideas and other applications (Chair: S. Pascarelli)

KEYNOTE: Yoshio Kono (GRC, Ehime Univ.)

“Opposed-type double-stage cell for large volume experiments at >100 GPa and its potential use of NPD”

Guillaume Morard (CNRS)

“Pure iron phase diagram probed by multiple techniques”

Norimasa Ozaki (Fac. Eng., Osaka Univ.)

“Study on shock-compressed nanopolycrystalline material”

M. Satish-Kumar (Fac. Sci., Niigata Univ.)

“NPD as a carbon isotope standard for in situ analysis”

10:30-11:50

7. Discussion and future perspectives (Chair: T. Irifune)

KEYNOTE: Sakura Pascarelli (Mat. Extreme Cond., ESRF)

“Use of Nanopolycrystalline Diamond Anvils overseas: scientific impact, present status and future needs”

Discussion

12:00-17:30

Excursion to Uchiko town: Historical town in Edo era (some 200 years ago), about one hour from Matsuyama by a chartered bus (lunch box + drink will be served).

17:30-

You are free