## HYDROGEN IN TRIBOLOGICAL PROCESSES
### 2019 HYDROGENIUS & I²CNER TRIBOLOGY SYMPOSIUM
### HYDROGENIUS TRIBOLOGY DIVISION
### & I²CNER HYDROGEN MATERIALS COMPATIBILITY DIVISION

**DATE:** WEDNESDAY, JANUARY 30, 2019  
**TIME:** 13:00-18:00  
**VENUE:** LECTURE THEATER 303, SHIIKI HALL

<table>
<thead>
<tr>
<th>Time</th>
<th>Program and Speaker</th>
</tr>
</thead>
</table>
| 13:00-14:30   | **Session 1**  
Chairperson: Yoshinori Sawae, Kyushu University                                      |
| 13:00-13:40   | **Keynote Lecture 1**  
Influence of cryogenic hydrogen environment on the tribological properties of materials  
Thomas Gradt, Bundesanstalt für Materialforschung und -prüfung (BAM), Germany |
| 13:40-14:05   | **Invited Talk**  
Friction and wear of DLC and stainless steel in various environmental gas  
Yuya Hayashi¹, Keiji Sasaki¹, Taichi Araki², Hiroyoshi Tanaka², Joichi Sugimura²  
¹DENSO Corporation, ²Kyushu University, Japan                                       |
| 14:05-14:30   | **Invited Talk**  
Approaching for low friction with high permittivity material under oil lubrication  
Motoyuki Murashima, Nagoya University, Japan                                         |
| 14:30-14:40   | Break                                                               |
| 14:40-15:55   | **Session 2**  
Chairperson: Joichi Sugimura, Kyushu University                                   |
| 14:40-15:05   | **Invited Talk**  
Molecular simulations for boundary lubrication under specific conditions  
Hitoshi Washizu, University of Hyogo, Japan                                          |
| 15:05-15:30   | **Invited Talk**  
Effect of molecular structures of oils on amounts of hydrogen evolution through decomposition of oils by action of discharge plasma  
Satoshi Nouyama¹, Keiji Nakayama²  
¹Kyodoyushi Co., Ltd., ²Institute of Mesotechnology, Japan                            |
| 15:30-15:55   | **Invited Talk**  
Generation and permeation of hydrogen at metal surfaces  
Hiroyoshi Tanaka, Kyushu University, Japan                                             |
| 15:55-16:00   | Break                                                               |
| 16:00-16:40   | **Joint Session with Hydrogen Polymers Team**  
**Invited Talk**  
TBD                                                                                 |
| 16:40-16:45   | Break                                                               |
Poster Session

PT01. Performance of bearings and shaft-seals for reusable rocket engine turbopump
Hiromitsu Kakudo, Takashi Yokoyama, Satoshi Takada, Makoto Yoshida
Japan Aerospace Exploration Agency (JAXA), Japan

PT02. Correlation of PV value with wear of DLC in hydrogen
Hirofumi Hashiba¹, Takehiro Morita², Yoshinori Sawae², Joichi Sugimura²
¹Aisan Industry Co., Ltd., ²Kyushu University, Japan

PT03. Effect of doped metals on low friction of DLC coatings
Kohei Shirahama, Hiroyoshi Tanaka, Joichi Sugimura, Kyushu University, Japan

PT04. The effect of oxygen on the tribology of (PEI/GO)15 multilayer solid lubricant coatings on steel substrates
Prabakaran Saravananan, Hiroyoshi Tanaka, Joichi Sugimura
Kyushu University, Japan

PT05. Low friction of carbon fiber filled PTFE in high-purity hydrogen
Rui Taninokuchi, Keito Sakaki, Takehiro Morita, Yoshinori Sawae, Joichi Sugimura
Kyushu University, Japan

PT06. Effect of environmental gas on friction and wear of rubbers in reciprocal and uni-directional sliding
Joichi Sugimura, Kazumi Okada, Hiroyoshi Tanaka, Kyushu University, Japan

PT07. Fatigue cracking of rubbers in reciprocating sliding contact in hydrogen
Joichi Sugimura, Kazumi Okada, Hiroyoshi Tanaka, Kyushu University, Japan

PT08. Controlling hydrogen permeation: Effect of base oil polarity on ZDDP film growth
Vlad Bogdan Niste¹, Hiroyoshi Tanaka¹, Monica Ratoi², Joichi Sugimura¹
¹Kyushu University, Japan, ²University of Southampton, UK

PT09. Effects of molecular structures on decomposition of lubricating oils at nascent metal surface
Shun Honda¹, Hiroyoshi Tanaka¹, Yoji Sunagawa², Joichi Sugimura¹
¹Kyushu University, ²Idemitsu Kosan Co., Ltd., Japan

PT10. Study on hydrogen generation and permeation under rolling contact of steel with phenyl ether lubricants
Shotaro Koizumi, Hiroyoshi Tanaka, Joichi Sugimura, Kyushu University, Japan