FRAUNHOFER INSTITUTE FOR
CERAMIC TECHNOLOGIES AND SYSTEMS IKTS

WORKSHOP INVITATION

High-performance screen-print pastes, nano-inks and -powders – towards the next generation of power electronics and advanced functional elements

Dear Ladies and Gentlemen,

the Fraunhofer IKTS cordially invites you to its 3rd technical workshop on January 30, 2015 at the Tokyo International Forum.

Power electronics is becoming a key technology for a rising number of products and systems due to a global trend to green energy and the establishment of electric mobility. For increasing local current transport and storage, new low-cost converting equipment is needed. Complex key challenges such as systems integration, higher energy density, better heat dissipation, robustness and reliability as well as optimized passive components cannot be overcome by use of the established material systems on the market today, as Direct Copper Bond (DCB) on Al_2O_3 or AlN, or Active Metal Brazing (AMB) on Si_3N_4.

To get full flexibility in the power unit design, screen-print pastes with a broad variety in properties on the substrate materials Aluminum Nitride and Silicon Nitride ceramics are desirable. Aluminum Nitride has an outstanding thermal conductivity and a thermal expansion TEC matched to the low loss "wide bandgap" chip material Silicon Carbide. **At Fraunhofer IKTS, a complete REACH and RoHS conform paste system has been developed featuring contacts, a full range of different resistors and overglazes.** New additives, adopted organic vehicle, and modified manufacture technologies are used to tune properties such as the temperature coefficient of the resistor and adhesion strengths of solder joints. For the sake of heat spreading, thick-print copper and silver pastes could replace DCB units in many devices. However, it is challenging to get sufficient adhesion simultaneously with smooth, solderable, and bondable surface on AlN. **The presentation shows the research of Fraunhofer IKTS in the field of thick-film pastes and demonstrates the performance of 300 µm copper films as well as 50 µm silver films on AlN**.

Additionally, you will be given an insight into the development of functional materials besides screen-print pastes such as nanoinks and slurries that are used in electrochemical storage and conversion devices as well as microsystems. All developed products have been adjusted for proper coating technologies like mask and screen-printing, tape casting or direct writing methods. Extensive experience and outstanding technical equipment allow to satisfy the complex requirements in applications such as fuel cells, Li-ion batteries and supercapacitors as well as chemical and physical sensors.

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The optimization of manufacturing steps with focus on volume manufacturing processes (up-scaling for powders, paste and inks production, applications for screen and ink-jet printing, cost effective co-sintering or low-temperature sintering etc.), reproducibility and cost reduction is an important factor for latest and further development.

Agenda

10 am to 10:30 am	Introduction
10:30 am to 11:15 am	Part I: High-performance screen-print pastes for AlN and Si_3N_4
11:15 am to 12 pm	Part II: From powders, inks and pastes to advanced functional elements

We would like to enter into keen discussions and are looking forward to seeing you.

Please report back concerning your participation in the seminar until **January 23, 2015** via e-mail to corinna.jaehnig@ikts.fraunhofer.de.

Date
January 30, 2015 from 10 to 12 am

Venue
Room 801, Tokyo Big Sight

Speakers
Markus Eberstein (Ph.D.), Thick-film Technology and Photovoltaics,
Nikolai Trofimenko (Ph.D.), High-temperature Electrochemistry and Catalysis

The workshop is held in English with simultaneous Japanese translation.
The participation is free.