

## TOPICS

- Carbon resources and industrial importance
- Basic reactions and conversion processes
- Coal tar pitch – Precursor for carbon materials
- Carbon blacks: Manufacturing and application
- Activated carbon: Production and application
- Carbon linings for primary aluminum production and iron making
- Carbon & Graphite materials in corrosive and high temperature process applications
- Manufacturing and application of graphite electrodes for steel production
- Fine grained carbon and graphite materials
- Industrial applications of natural graphite
- Expanded graphite and its applications
- Carbon fibers
- Carbon/Carbon-Composites: A lightweight material for high temperature applications
- Manufacturing and application of carbon and graphite for energy storage
- Manufacturing and application of carbon and graphite materials in Li-ion batterie
- Nanoforms of carbon: Manufacturing, potential application and health risks
- SiC – Manufacturing and application

## LANGUAGE

The course will be held in English.

## SCHEDULE

Beginning: Wednesday, 28<sup>th</sup> of September, 9 am  
End: Thursday, 29<sup>th</sup> of September, 3 pm

## FURTHER INFORMATION

### Venue

TU Darmstadt  
Alarich-Weiss-Straße 8  
64287 Darmstadt

### Registration

Please register online:  
<http://www.eccm2022.dkg.de>

### Registration fee

Regular	850.-- €
AKK / DKG Member	770.-- €
Students	450.-- €



ARBEITSKREIS KOHLENSTOFF  
DER DEUTSCHEN KERAMISCHEN GESELLSCHAFT E.V.

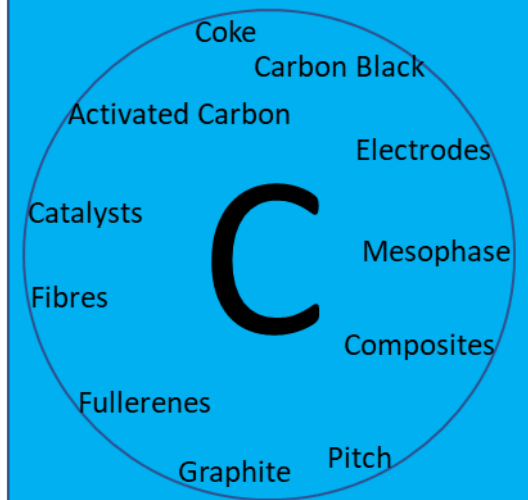


## Intensive Course

28 – 29 September 2022

TU-Darmstadt

## European Course on Carbon Materials



## SCOPE AND CONTENT

Industrial carbon materials, although not well known to the public, are essential for the operational capability of a modern economy. The annual production of about 1.7 billion tons of steel requires carbon and graphite bricks for the blast furnace. The melting of steel scrap is the biggest recycling process on earth. It produces about 400 million tons of recycled steel under the consumption of 1.1 million tons of graphite electrodes. Aluminum is a light metal with gaining importance in light weight construction. The annual production of 52 million tons of primary aluminum in the Hall-Héroult electrolysis requires more than 24 million tons of calcined petroleum coke.

Beyond these fields of base metal production fine grained graphite has many facets of applications. These applications reach from non-ferrous metallurgy, glass production, components for the production of mono- and polycrystalline silicon, susceptors for silicon epitaxy, solar wafer production, nuclear application, electrical discharge machining, to applications in high temperature furnace technology as susceptors and crucibles. Last but not least, specialty graphite is important for chemical analysis methods and medical technology.

The participants will learn about the raw materials, the manufacture of granular carbon materials and their specific application. Synthetic carbon and graphitized materials are the result of thermal conversion processes. Thus more information will be given about their basic reactions and principles.

Most of the industrial carbon and graphite materials are synthesized from carbonaceous precursors. But also natural graphite is an

important raw material. The majority of natural is still consumed for refractory applications. However, its use as anode material in lithium-ion batteries is fundamental for electro-mobility.

Activated carbons with their high specific surface area are indispensable for air and water cleaning processes. Furthermore, the high surface area enables the use in electric double layer capacitors (EDLC's).

Carbon black is with us whenever we ride in an automotive. Beyond the use in tires and rubbers, carbon black is as a pigment responsible for the most brilliant black paint.

Global warming discussion drives the effort and investment into light weight construction. Carbon fibers combine highest specific strength and stiffness and thus are predestinated for the use in automotive and aviation applications. Construction with carbon fibers reinforced concrete opens new spectacular design opportunities in buildings.

The reaction of carbon with its next group neighbor in the periodic system, silicon to silicon carbide extends the way into ceramics. The control over the high brittleness of ceramics can be achieved by the reinforcement of SiC with carbon fibers (CSiC). Areas of application are wear components and ballistic protection systems.

Many physical properties of graphite are not yet sufficiently used. Better use and new, huge fields of application can be generated with nanoforms of the element carbon. This comprises fullerenes, single- and multiwall nanotubes, graphenes and other nanoforms. Most promising fields of application are in electronics, sensor technology, medical and also mechanical applications..

## PURPOSE

This event is intended as a refresher course for colleagues who are active in carbon technology. The course is also well suited for scientists and engineers who are newcomers in the field of carbon materials, including students in the fields of technical chemistry, chemical engineering and material science.

## PRESENTATION

Most of the topics will be presented in lecture form. However, there will also be time for discussions. All aspects, remaining questions etc. will be summarized in a final round-table discussion with lecturers and participants.

## COURSE MATERIALS

On arrival at the course, each participant will receive a USB-stick with the presented material containing all relevant figures and tables shown in the lectures and selected references as well.

The material is intended as a guide for the user after the course during his own work with carbon materials.