

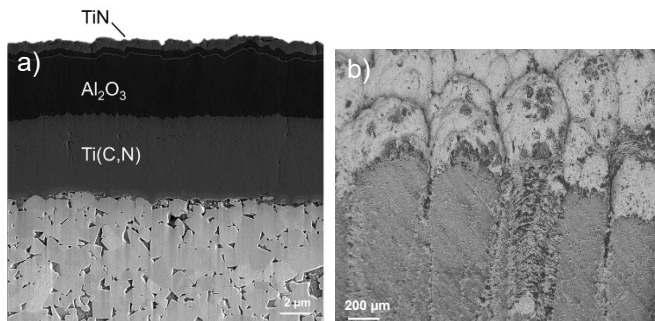
## Functional Ceramics and Hard Materials (TRA 100 and TRA105)

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Solid materials can be divided into three basic classifications: metals, ceramics and polymers, and ceramics. It is important to realize that ceramics are more than pottery and tableware. Have you ever wondered what makes ceramics and hard materials so special and why ceramics can be found in so many different applications? Have you wondered if these materials can be part of the rapid change in technologies in today's and tomorrow's society and how they can become key players in future sustainable solutions in the fields of energy, communication, engineering, and consumer products?

If you are interested in these topics, then join the Tracks course "Functional Ceramics and Hard Materials".



Figures: (a) Cross section trough cutting tool; (b) graphene-containing YSZ suspension plasma sprayed coating.

Tracks courses aim to allow participants to develop inter-disciplinary competencies, meet their expectations and shorten the lead times in changes of education. The course provides lectures, hands-on activities, and project work. The course is generic, but materials science background on basic level is required. The course will combine theoretical parts and basics with hands-on assignments and discussions and project assignment. Topics covered will include properties and manufacturing, types of ceramic and hard metals, sustainability aspects, high temperature applications, wear and low friction applications, electrical applications, batteries and fuel cells, hard coatings, and ceramic composites.

### Who should apply?

The course is intended for anyone with a keen interest in materials and their applications. Students with engineering backgrounds physics, and chemistry are all mostly welcome to send in an application to the course.

### Why apply?

The course will provide knowledge on

- Basics on ceramics and hard metals
- Ceramic matrix composites and new material developments
- Potential applications such as thermal barrier coatings, cutting tools, bearings and seals, batteries, microelectronics, heating elements, and consumer goods.

### How to apply?

The course is available on basic (TRA100) and advanced (TRA105) level for all students who meets educational requirements as an elective course in-between educational programs.

To attend the course - send a course application by e-mail to the examiner; Uta Klement, [Uta.Klement@chalmers.se](mailto:Uta.Klement@chalmers.se)

The application shall

1. Be labelled TRA100 or TRA105 (depending on level) "Functional Ceramics and Hard Materials"
2. Include
  - Your name and personal number.
  - Your e-mail address
  - Brief description of your educational background and a justification for your interest in the course (max 500 words).

**Last date for sending in applications:  
February 25<sup>th</sup>, 2022**

Admission to the course will be communicated by email no later than March 4<sup>th</sup>, 2022.