

# WELCOME TO STOCKHOLM



## EUROMAT 2019

EUROPEAN CONGRESS AND EXHIBITION  
ON ADVANCED MATERIALS AND PROCESSES

[HTTP://EUROMAT2019.FEMS.EU/](http://EUROMAT2019.FEMS.EU/)

1-5 SEPTEMBER 2019

STOCKHOLM, SWEDEN

**FEMS**  
FEDERATION OF EUROPEAN  
MATERIALS SOCIETIES

**30**  
1987 - 2017  
[www.fems.org](http://www.fems.org)

**SfMT**  
THE SWEDISH SOCIETY OF MATERIALS  
TECHNOLOGY

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# Dear colleagues



We have the honour to invite you to join your peers and subject matter experts at EUROMAT2019, to be held in Stockholm, the capital of Sweden, from 1 – 5 September, 2019.

EUROMAT is the premier international congress in the field of materials science and technology in Europe. The EUROMAT2019 congress venue will be the Stockholm City Conference Centre, [www.stoccc.se](http://www.stoccc.se), conveniently situated in the city center of Stockholm only a few minutes' walk from the Grand central station of Stockholm and the high speed train connection to Arlanda airport.

Stockholm, the capital of Sweden and Scandinavia, is probably one of the most beautiful capitals of the world and at the same time, the country of Sweden, -as everybody knows today – guarantees a very well planned and organized conference with the guests and participants in focus during a week in the late summer/beginning of fall.

Sweden has a long tradition in manufacturing and application of advanced materials. Materials Science is therefore an important field of research and technological development in Sweden with involvement of both academia and industry. Being the host for EUROMAT2019, the Swedish Society for Materials Technology (SFMT) has the vision to:

- Facilitate a programme where academia, research institutes and industry can meet and exchange ideas and provide information on the latest scientific development.
- Promote involvement of top universities and researchers in materials science including special contribution from large scale facilities like MAXIV in Lund
- Demonstrate efficient knowledge transfer between research and its application through the active involvement of research institutes on Sweden like RISE and Swerea
- Develop the involvement of Nordic countries in FEMS and EUROMAT
- Strengthen the EUROMAT2019 concept through its co-operation with Royal Academy of Engineering Sciences, The Swedish Steels Producer's Association (JERNKONTORET), National Innovation Programmes, Excellence Initiatives in Materials Science, Funding Bodies and International Partners

**We look forward to seeing you in Stockholm at EUROMAT 2019**

On behalf of the Scientific and Management Committees

*Sten Johansson*

PRESIDENT, Swedish Society for Materials Technology, SFMT

# General information

## Dates

1-5 September 2019

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## Venue

Stockholm City Conference Centre  
Folkets Hus, Barnhusgatan 12-14,  
111 23 Stockholm

Norra Latin,  
Drottninggatan 71 b,  
111 23 Stockholm

Arlanda International Airport is only 20 minutes by train north of Stockholm. The EUROMAT2019 congress venue will be the Stockholm City Conference Centre, [www.stoccc.se](http://www.stoccc.se), conveniently situated in the city center of Stockholm only a few minutes' walk from the Grand central station of Stockholm and the high speed train connection to Arlanda airport.

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## Currency

Swedish krona - SEK  
Please note that Sweden is working towards a cash-free society and most vendors accept payment by credit card.

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# Important dates

Announcement of Symposium Organizers,  
May-June 2018.

Abstracts instructions available on the website,  
May-June 2018

Opening of Abstract Submission and  
Congress Registration,  
Mid-Sep 2018

Dead-line for Abstract Submission,  
**January 31 2019**

Evaluation of Abstracts,  
March 2019

Authors Notification,  
April 2019

## VISA and Passport Requirements

Participants are advised to contact the nearest embassy or consulate for information about the passport and visa requirements from their country for entry to Sweden.

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## Language

The official language of the Congress is English. There will be no translation facilities available for the congress participants.

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## Accommodation

The EUROMAT 2019 society has selected a number of hotels with special rates for Congress participants. A list of hotels along with reservation links will be available on [www.euromat2019.fems.eu](http://www.euromat2019.fems.eu) in due course.

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## Time Zone

UTC/GMT +2 hours

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## Registration fees

Registration fees will be available on [www.euromat2019.fems.eu](http://www.euromat2019.fems.eu) in due course.

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Nomination of sessions chairs,  
May 2019

Preliminary Program,  
June 2019

Dead-line early bird registration,  
Mid-June 2019

Final Program, August 2019,  
continuously updated

EUROMAT 2019,  
1-5 September 2019

# Area Areas/Area leaders

Area A	Functional Materials
Area B	Structural Materials
Area C	Processing
Area D	Characterization and Modelling
Area E	Energy and Environment
Area F	Materials for Healthcare
Area G	Education, Strategy and Technology Transfer
Area H	Raw Materials
Area I	Bio-based materials

# Organizing Societies



**Swedish society  
For Materials  
Technology**

# Professional Congress Organizer



Academic Conferences  
Universities in cooperation: Karolinska Institutet,  
SLU and Uppsala University  
Address: Box 7059, 750 07 Uppsala, Sweden  
Phone +46 18 67 10 03  
E-mail: EUROMAT2019@akademikonferens.se

# Facts about Sweden

- The population is 10 million people
- Sweden has 95 700 lakes
- The country is 1 574 km long
- In the North, in July, the sun never sets, however, in the winter the sun never rises
- The first IKEA store started in 1958 in Stockholm. Today IKEA has 355 stores in 29 countries.



[See videos and read more about Stockholm and Sweden here!](#)

## Greetings

Swedish	English
God morgon!	Good morning
God natt!	Good night
Hej!	Hello
Ja	Yes
Nej	No
Nja (nej and ja)	No and yes
Hej då!	Bye-bye
Hur mår du?	How are you? (neutral)
or Hur står det till?	How are you? (formal)
or Hur är läget?	What's up? (informal)
Bara bra, tack. Och du?	I'm fine, thanks. And you?
Tack!	Thank you/Please (depending on the context)
Varsågod!	Here you go/Please/You're welcome (depending on the context)
Talar du engelska?	Do you speak English?
Trevligt att träffas	Pleased to meet you
Ursäkta mig!	Excuse me

## A2-WED-PM6-5 - Mechanical properties of N<sup>+</sup> ion irradiated vertically aligned carbon nanotube arrays studied by nanoindentation

A2. Multifunctional Materials for Novel Applications

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### Introduction/Purpose

In this work mechanical properties of N<sup>+</sup> ion irradiated vertically aligned carbon nanotube (VACNT) arrays were studied by flat punch nanoindentation. The ion implantation created an elastic, but brittle structure with a ~4 μm depth on the porous VACNT brush.

### Methods

N<sup>+</sup> ion irradiated energy was 50 keV and fluence of 5x10<sup>17</sup> ions/cm<sup>2</sup>. The VACNT film height was ~160 μm. Cyclic nanoindentation with a flat punch indenter studied the mechanical properties as a function of the indentation depth. One measurement consisted of 20 cycles from an indentation depth of 0.5 to 10 μm.

### Results

SEM images revealed the ion irradiation altered the carbon bonding and created a sponge-like, brittle structure at the surface of the film, with the ion irradiation damage region extending ~4 μm in depth. TEM images show the brittle structure consists of amorphous carbon forming between nanotubes. This structural change increases the film stiffness, and reduces the energy dissipation. The reference sample has a much higher loss coefficient of 60%, which signifies energy dissipation, and is constant for different indentation depths. After ion irradiation, the loss coefficient at lower indentation depths is 20% and at a 4 μm depth at the end of the irradiation damaged zone the coefficient suddenly increases to 30%. Additionally, the irradiation improved the recoverability. At low indentation depths the recovery was high at 90% and decreased monotonically to 70% with indentation depth, compared to just 30% recoverability in the reference sample.

### Conclusions

Irradiation on the VACNT film made the structure stiffer, resulted in a higher percentage recovery, and reduced the energy dissipation under compression.

