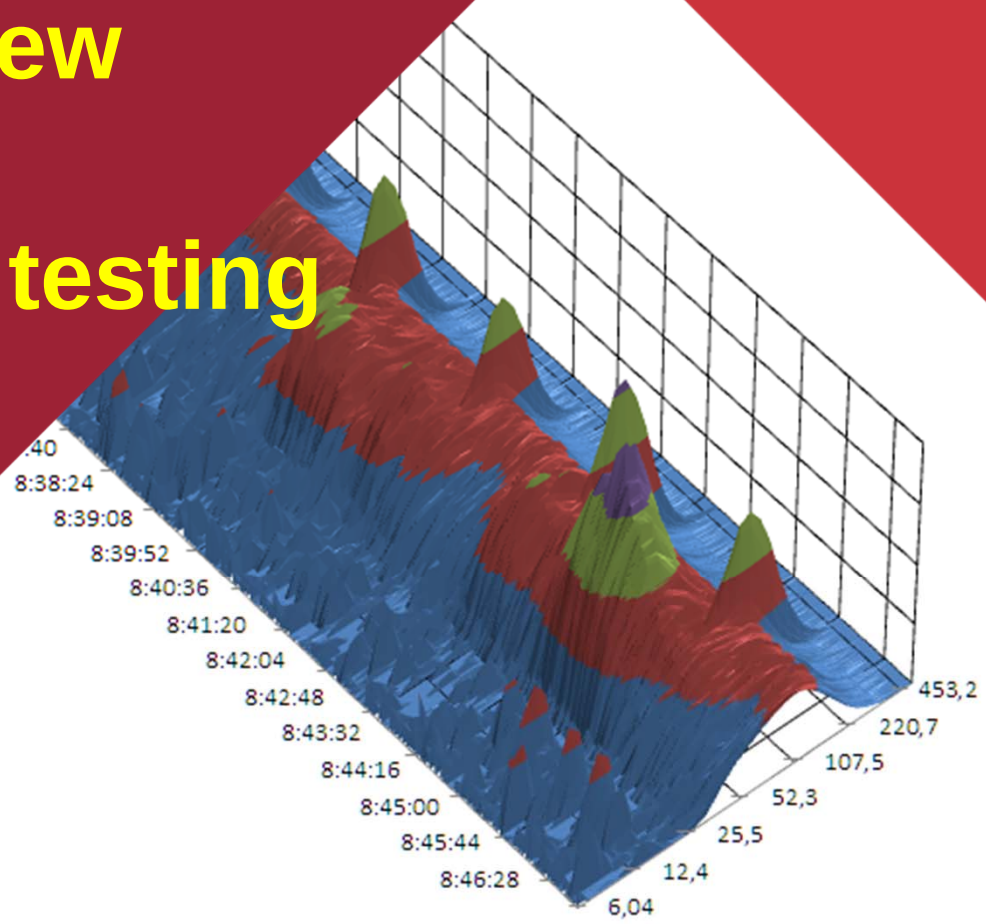
Wear & Particle emissions control in brake pads

1) **Project overview**

2) **Dynamometer testing**



ITT

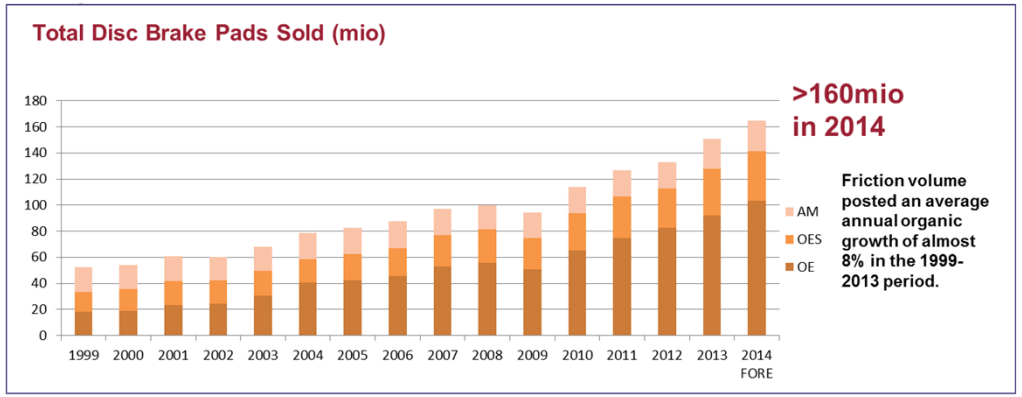
Outline

- **Project overview**
- **Dynamometer testing**

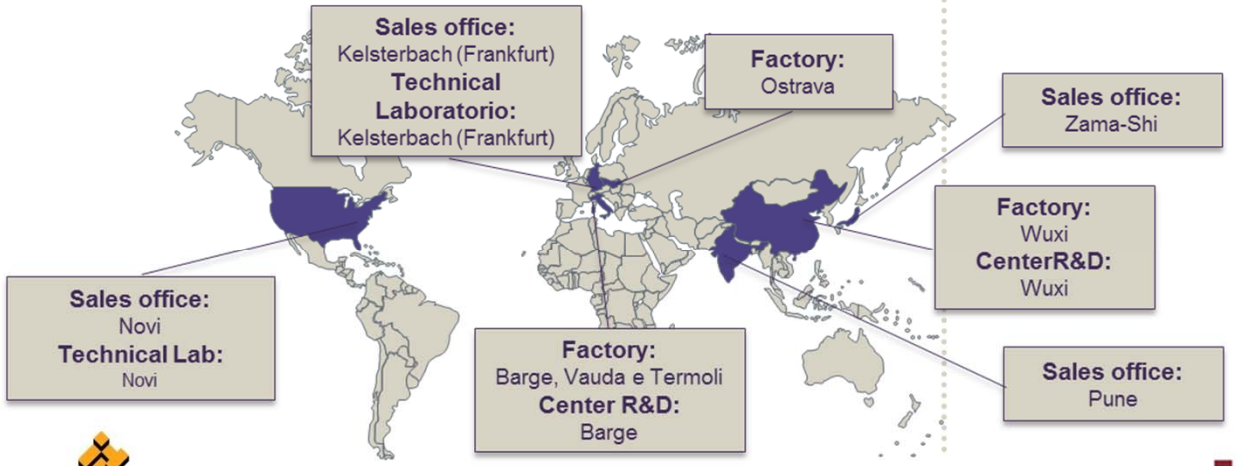
ITT Friction Technologies

Customer

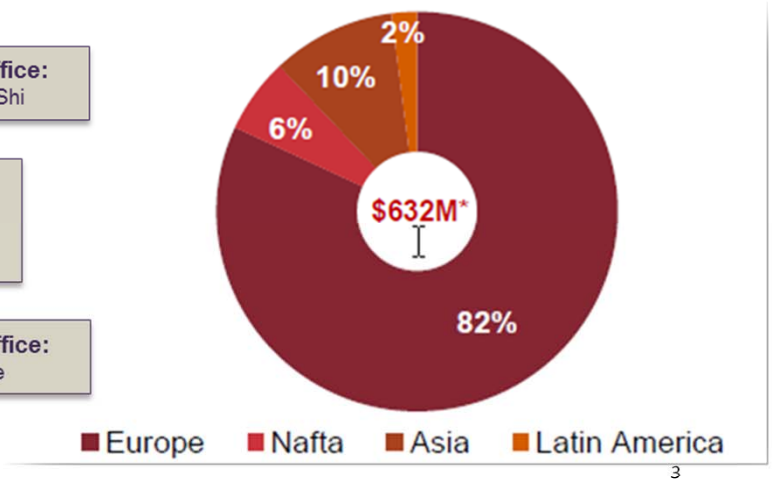
Production



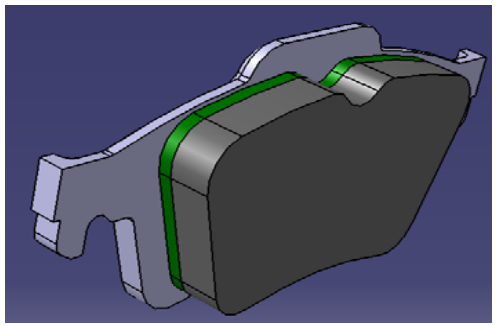
International Footprint



Sales Geographical area (2014)



Current materials for brake pads



Fillers and Abrasives
40-60% vol.

Al_2O_3,
ZrO_2,
Barite,
…

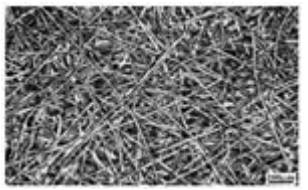
Phenolic Resins

Organic Binder
10-20% vol.

MoS_2,
Graphite,
…

Solid Lubricants
5-15% vol.

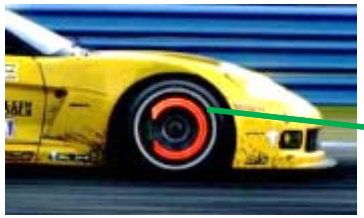
Fibers and Rubber
5-20% vol.

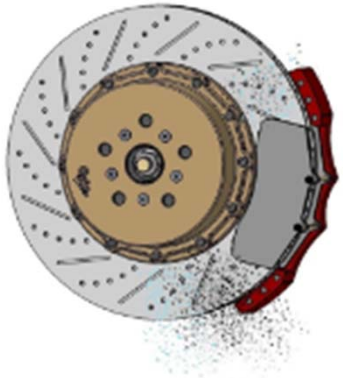


Metal,
Aramide
and
Glass fiber

ITT

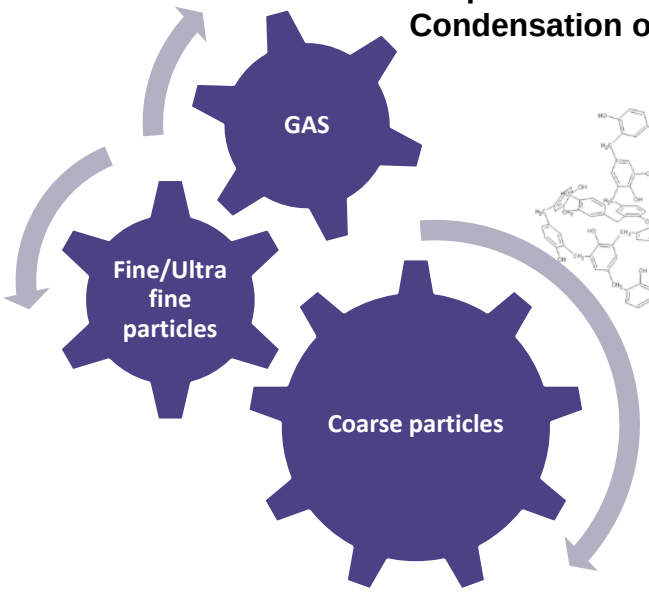
Wear & Emission from Brake systems



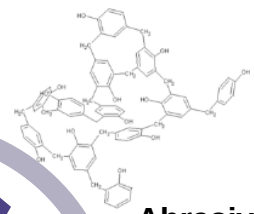


The wear process between the disc and the pad produce particles and gaseous emissions

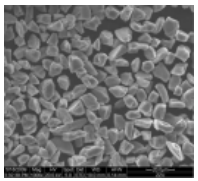
Emissions



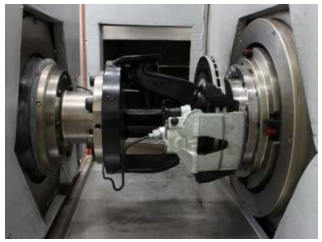
Evaporation and Condensation of organics



Abrasives, lubricant, fillers, disc wear…



Protocol Analysis



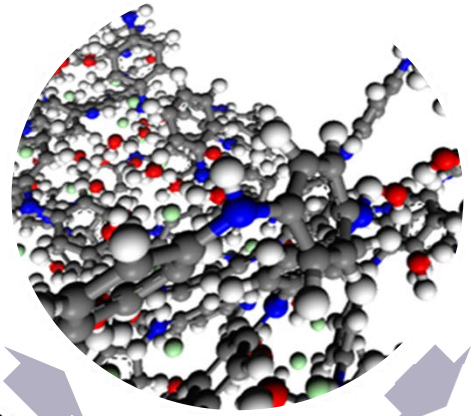
AKM, Mojacar, Ville taxi….

Mechanism

Understand the wear mechanism

Develop new pad generation with control wear & emissions

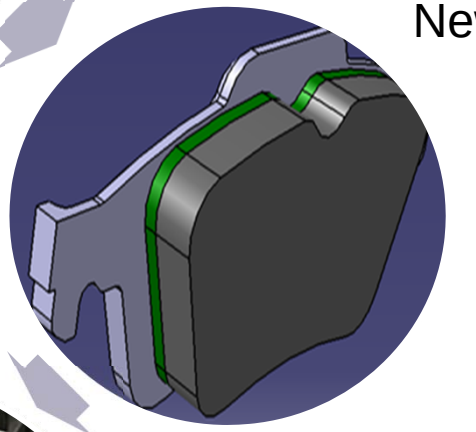
Project idea

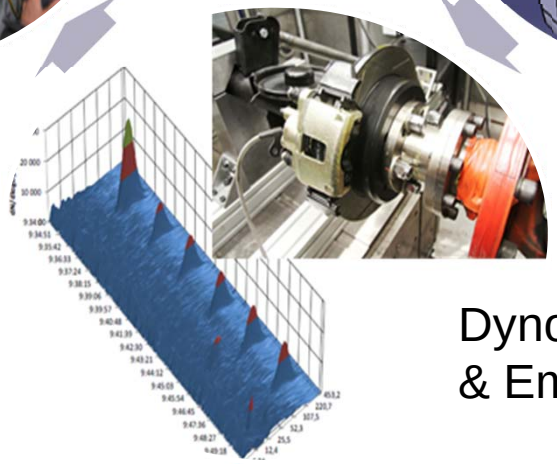


Computer modelling
of materials

Vehicle
testing

New pads





Dyno
& Emission testing

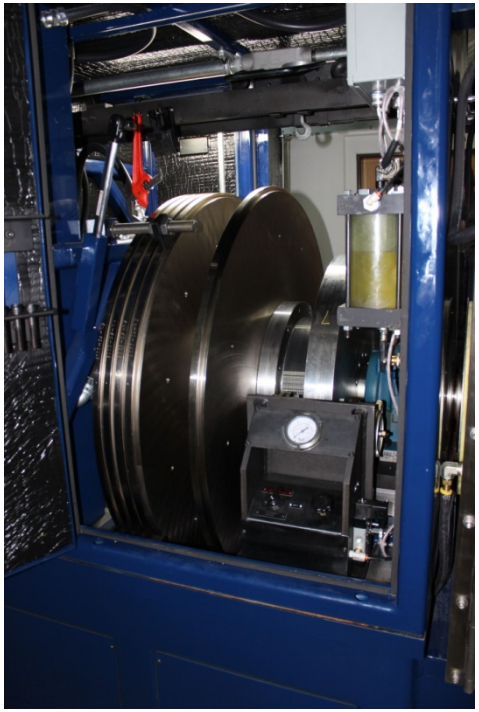
Outline

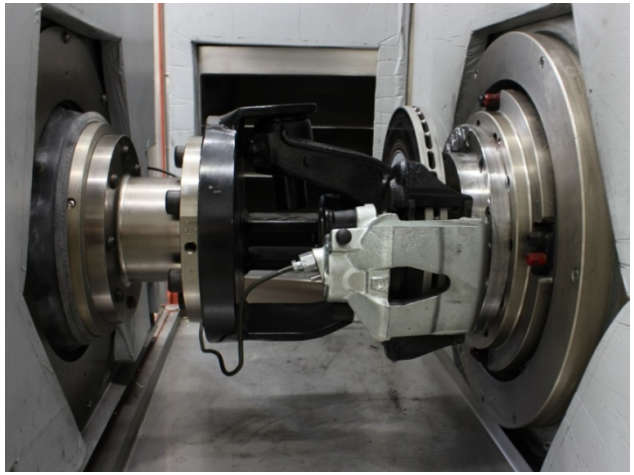
- Project overview
- **Dynamometer testing**

Dynamometer Testing

Laboratory brake dynamometer LINK M2800

VSB – Technical University of Ostrava
Czech Republic





Parameters:

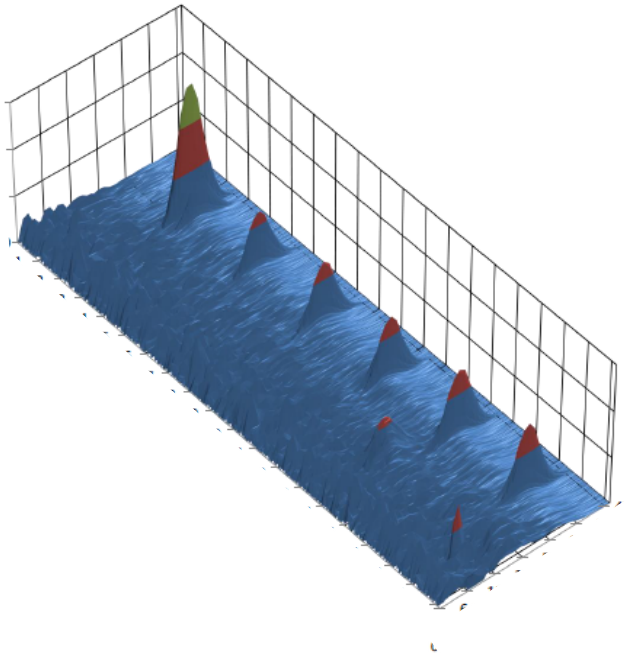
Speed: 0-2000 rpm
Brake pressure: 0-200 bar
Torque: 0-5000 N.m
Max. weight of a simulated vehicle: 3500 kg
Ambient temp.: 20±2 °C

Testing according to recommended practises (AK Master)

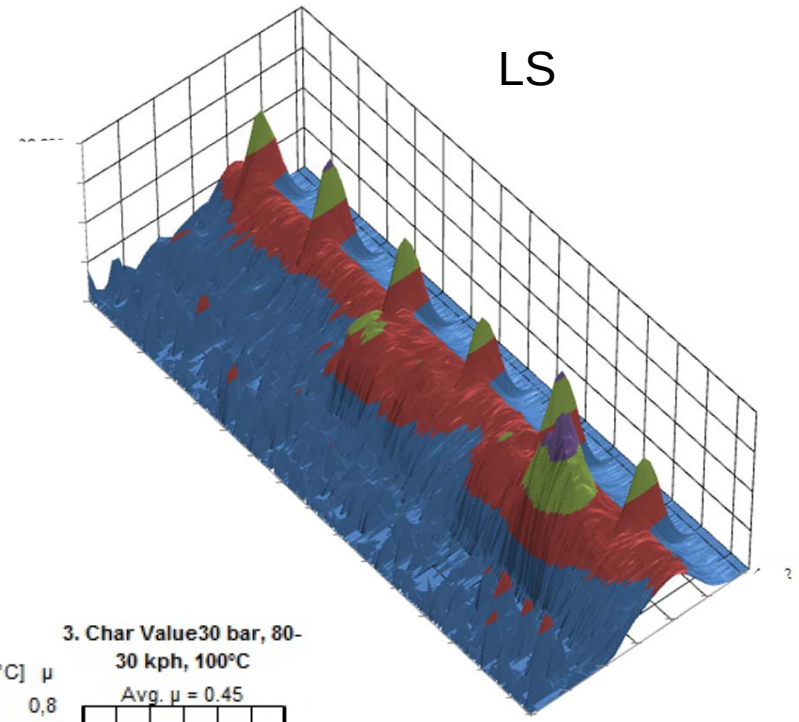
Creation of specific testing procedures

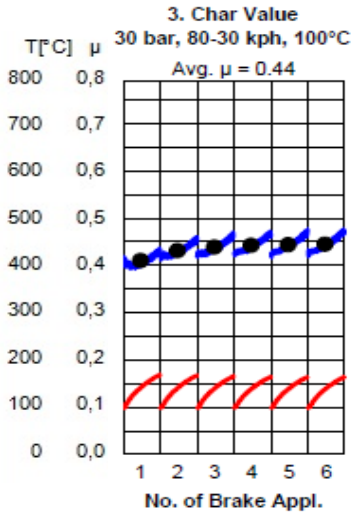
Characteristic value 1 (6 stops, 80 – 30 kph, 3000 kPa)

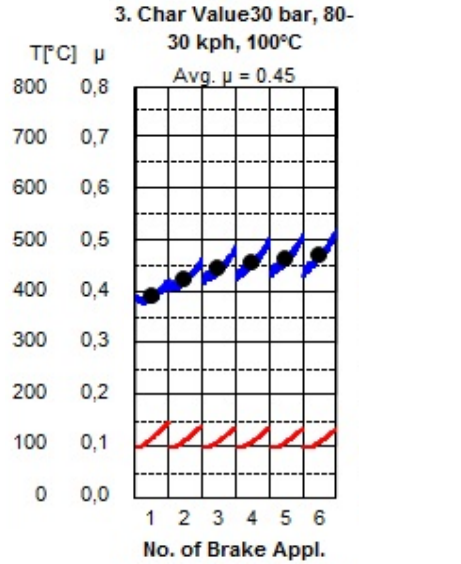
NAO



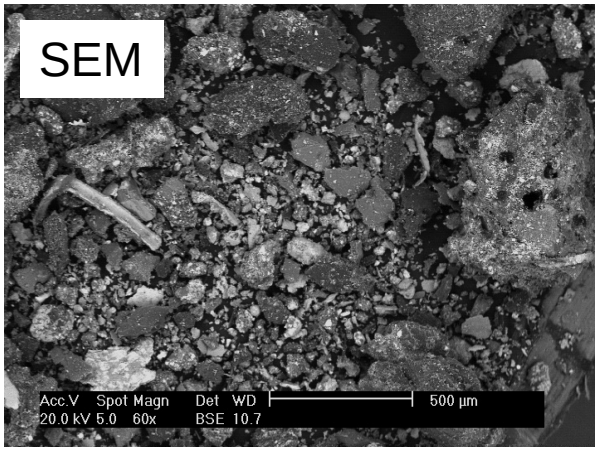
LS

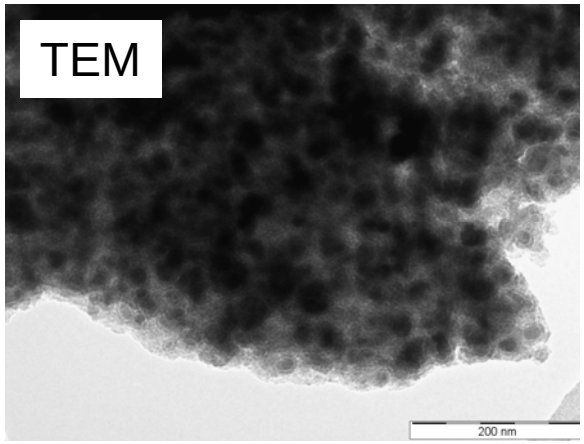


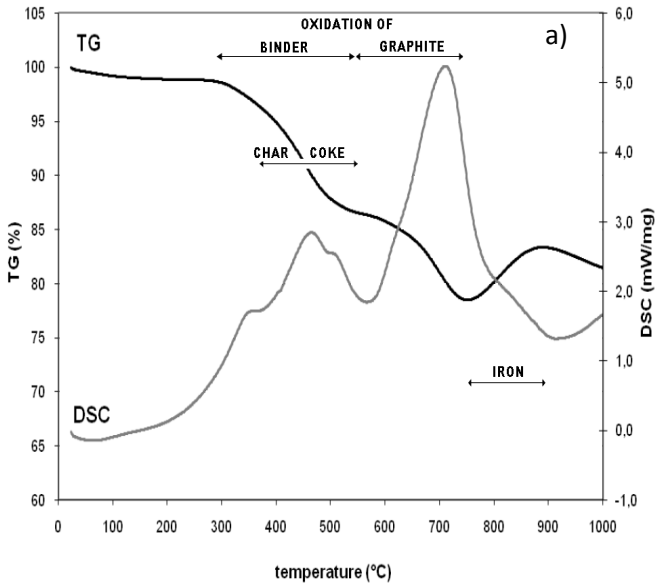


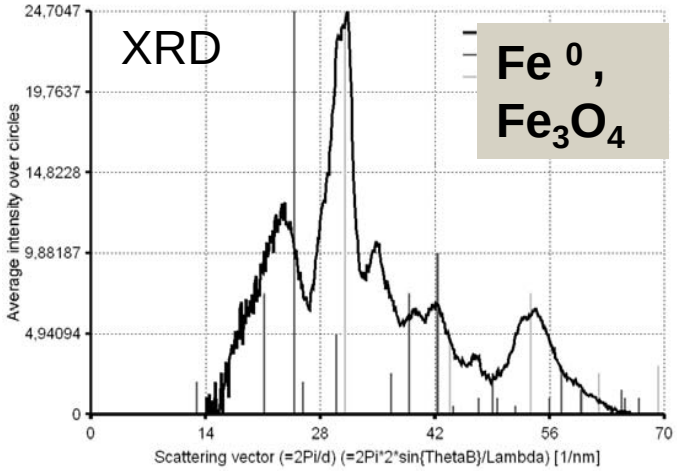


Experimental Techniques for Characterization of Brake Pads and Products of Friction Processes

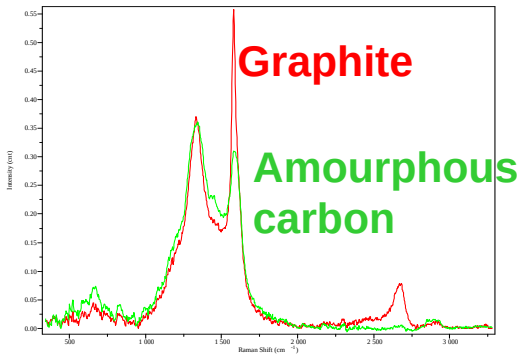


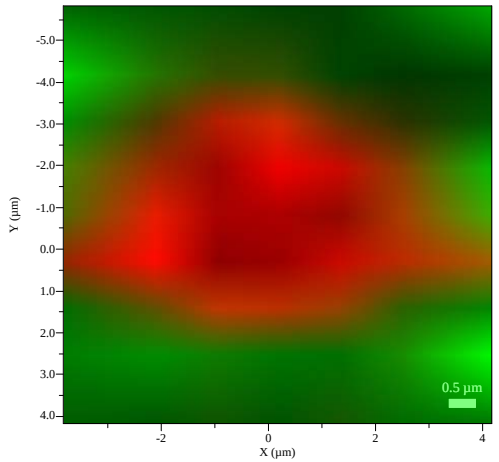






microRaman





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