OE 6 - Center za vibracijsko spektroskopijo -

FTIR / Raman / Rheology

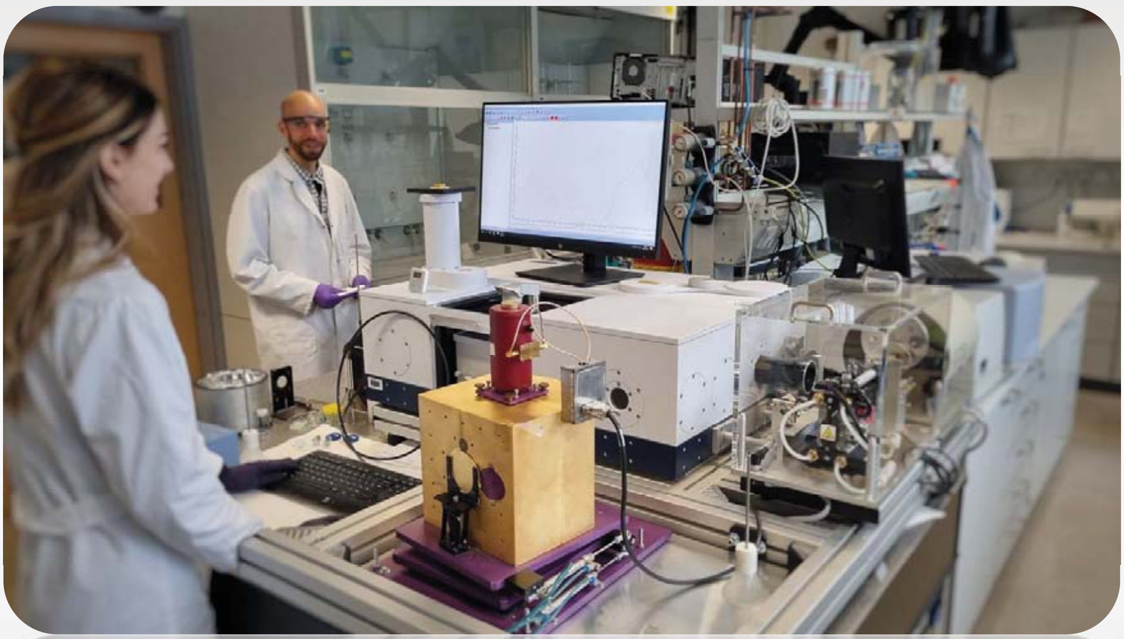
ivan.jerman@ki.si

Ljubljana, 14. 05. 2024

NATIONAL INSTITUTE OF CHEMISTRY

Equipment: Vakuum spectrometer Vertex 70V –

High temperature emission cell (25 – 1050 °C)
Optosol – reflection sphere (2500 – 15000 µm)



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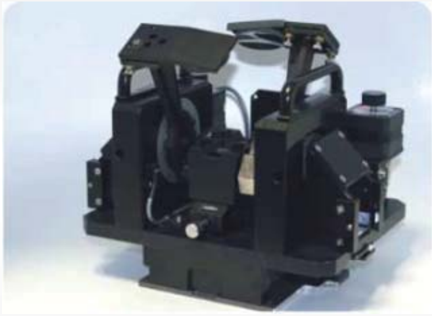
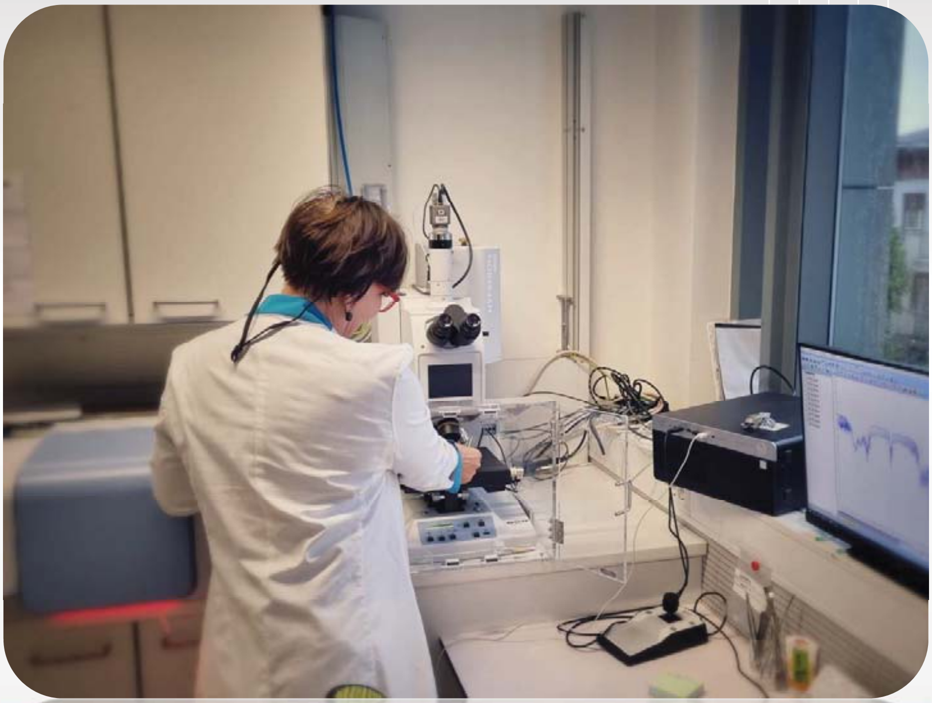
Equipment: Vakuum spectrometer Vertex 70V –

Platinum ATR accessory

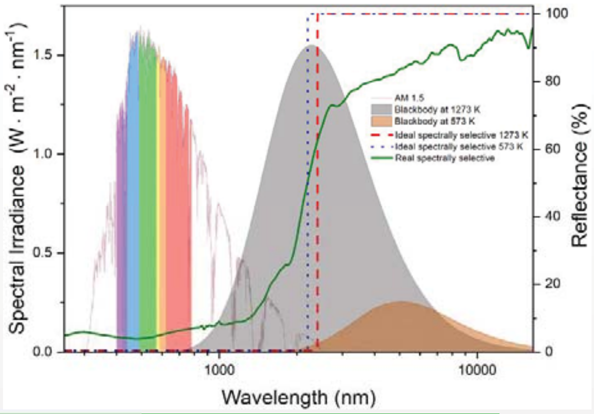


Variable angle reflection accessory

Equipment: Spectrometer Invinio and microscope Hyperion 3000



Equipment: Spectrometer Lambda 950



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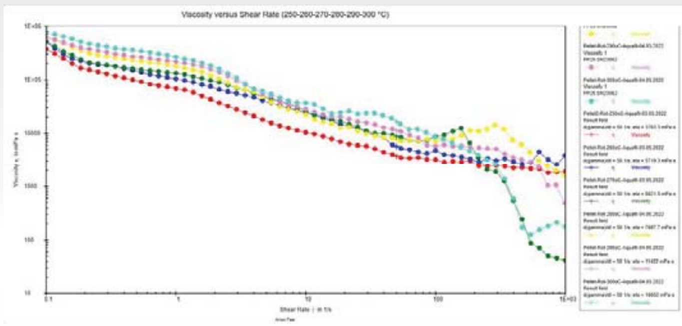
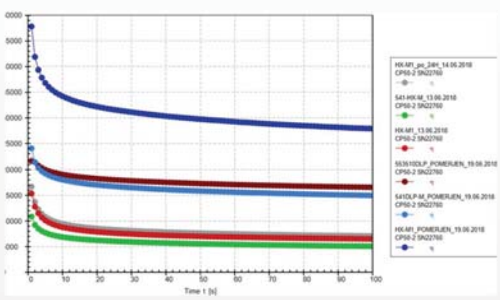
Equipment: Rheometer – Anton Paar MCR 301





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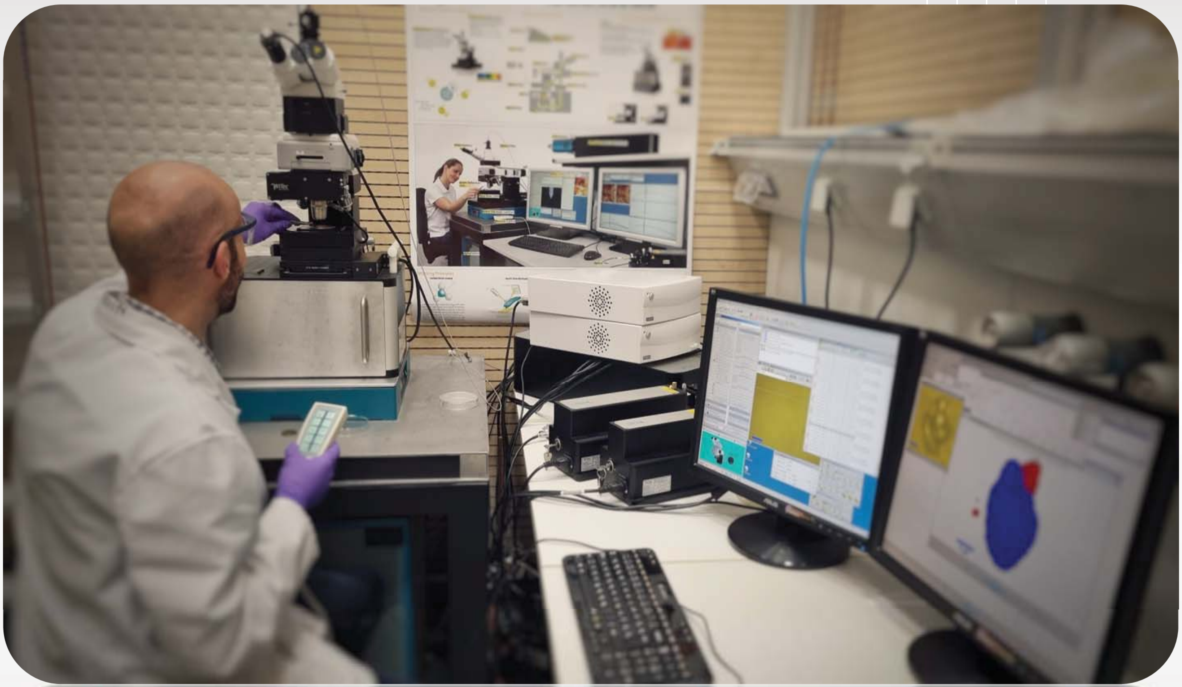
Equipment: Confocal Raman spectrometer Witec – Alpha 300 RAS



Support for research programs:

- P2-0393 Napredni materiali za nizkoogljično in trajnostno družbo,
- P2-0213 Tekstilije in ekologija,
- P1-0034 Analitika in kemijska karakterizacija materialov ter procesov,
- P2-0152 Kemijsko reakcijsko inženirstvo,
- P1-0021 Nanoporozni materiali,
- P1-0418 Kemija katalizatorjev za čist zrak
- P2-0423 Sodobni akumulatorji kot podpora zelenemu prehodu in elektromobilnosti …

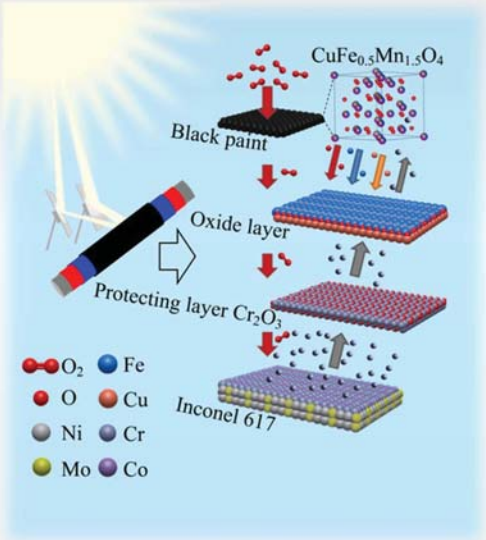
Support to national and international research projects:

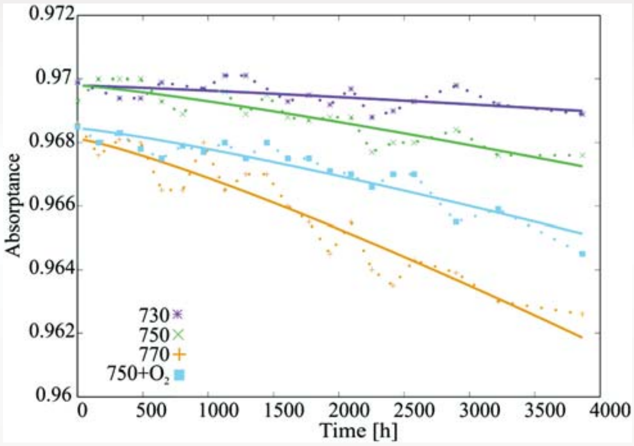
- Forthcoming Research and Industry for European and National Development of SHIP (RIA-EU),
- Renewable Aluminium Fuel Cycle (RIA-EU),
- Na Ion materials as essential components to manufacture robust battery cells for non-automotive applications,
- DESTINIY (Marie Skłodowska-Curie)
- WABASELCOAT,…

Support to industry:

- Mlekarna Celeia, Hella, Lek, Firšt, Metronik, Chemcolor, Krka, Domel; Siewa… (2018)
- Novartis, Sandoz, Tanin, Iskra, Hella, Eustone, Cinkarna, Chipolo, Aluflexpack… (2019)
- Steklarna Hrastnik, TKK, Valens, Krka, Koplast, Hella, Hidria, Elrad, Belupo, Brightsource, Filtrator… (2020)
- Lemi, Belupo, Bia, Firšt, Filtrator, Cetis, Krka, Lek, TKK, Eternit, Gamina, Herz … (2021)
- Bent, BSH Gorenje, Etiketa, Hidria, Tornado, Novartis, Chemcolor, Iskra mehanizmi, Fotona, Steklarna Hrastnik… (2022)

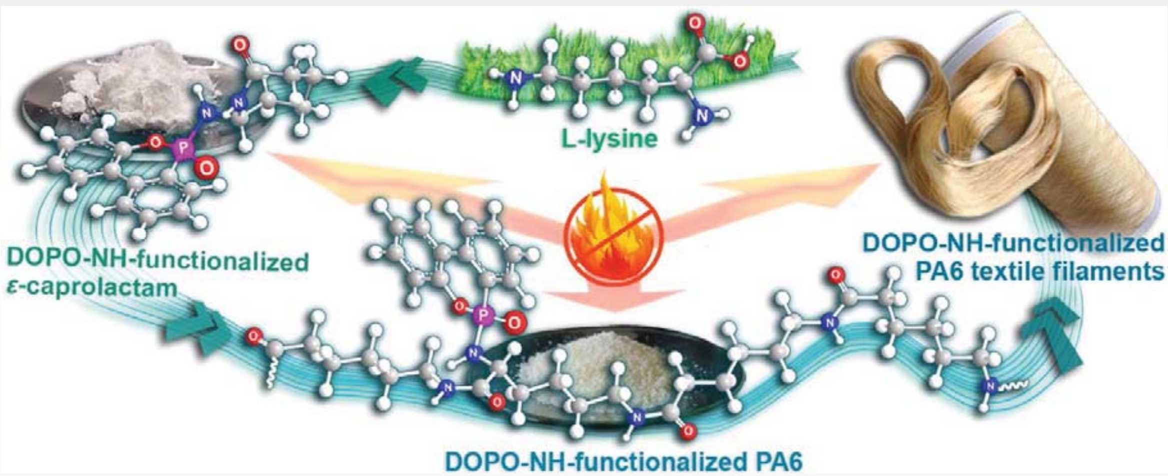
Case study: "High-solar-absorptance CSP coating characterization and reliability testing with isothermal and cyclic loads for service-life prediction"





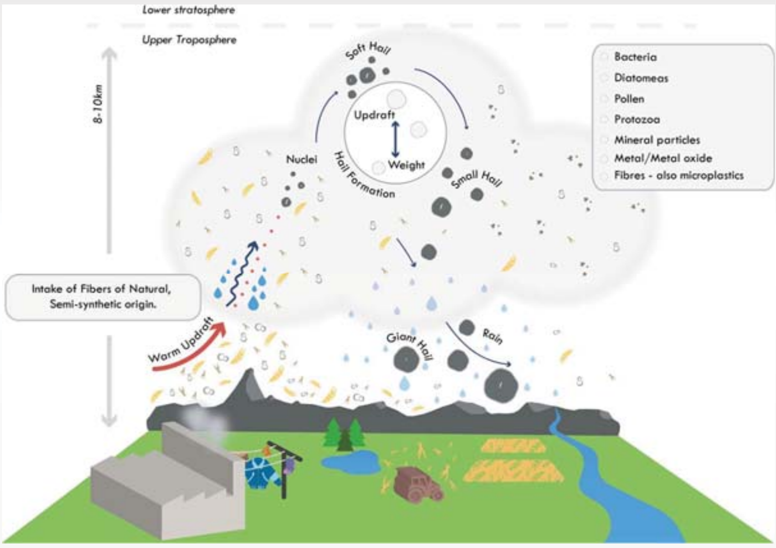
Ref: Energy Environ. Sci. (IF = 30), 2019, DOI: 10.1039/C8EE03536A
Solar Energy Materials and Solar Cells (IF = 7), DOI: 10.1016/j.solmat.2021.110984
DOI: 10.1016/j.solmat.2022.111625
DOI: 10.1016/j.solmat.2019.109974
DOI: 10.1016/j.solmat.2018.11.026

Case study: "New sustainable flame retardant DOPO-NH-functionalized polyamide 6 and filament yarn"



Ref: Chemical Engineering Journal. (IF= 16), 2021, DOI: 10.1016/j.cej.2021.130760
Solar Energy (IF = 7), DOI: 10.1016/j.solener.2021.11.046
Patent: EP 3 587 471 B1

Case study: “Dissecting giant hailstones: A glimpse into the troposphere with its diverse bacterial communities and fibrous microplastics”



Ref: Science of The Total Environment. (IF = 10), 2023, DOI: 10.1016/j.scitotenv.2022.158786

Case study: “skeletal remains”

Journal of CHEMOMETRICS

RESEARCH ARTICLE | Open Access

ATR-FTIR spectroscopy and chemometric complexity: unfolding the intra-skeleton variability

Irena Zupanič Pajnič, Tamara Leskovar, Ivan Jerman

First published: 23 September 2022 | https://doi.org/10.1002/cem.3448

Vibrational Spectroscopy

Unveiling intra-skeletal variability in mature and immature human skeletal remains via ATR-FTIR spectroscopy

scientific reports

OPEN **Comparison of DNA preservation and ATR-FTIR spectroscopy indices of cortical and trabecular bone of metacarpals and metatarsals**

AUSTRALIAN JOURNAL OF FORENSIC SCIENCES
2022, VOL. 54, NO. 4, 511–532
https://doi.org/10.1080/00450618.2020.1836254

Taylor & Francis

Preservation state assessment and post-mortem interval estimation of human skeletal remains using ATR-FTIR spectra

Tamara Leskovar[a], Irena Zupanič Pajnič[b], Ivan Jerman[c] and Matija Črešnar[a]

[a]Centre for Interdisciplinary Research in Archaeology, Department of Archaeology, Faculty of Arts, University of Ljubljana, Ljubljana, Slovenia; [b]Institute of Forensic Medicine, Faculty of Medicine, University of Ljubljana, Ljubljana, Slovenia; [c]Department for Materials Chemistry, National Institute of Chemistry, Ljubljana, Slovenia

International Journal of Legal Medicine (2020) 134:811–821
https://doi.org/10.1007/s00414-019-02079-0

ORIGINAL ARTICLE

Separating forensic, WWII, and archaeological human skeletal remains using ATR-FTIR spectra

Tamara Leskovar[1] · Irena Zupanič Pajnič[2] · Ivan Jerman[3] · Matija Črešnar[1]

Received: 23 November 2018 / Revised: 11 May 2019 / Accepted: 20 May 2019 / Published online: 7 June 2019
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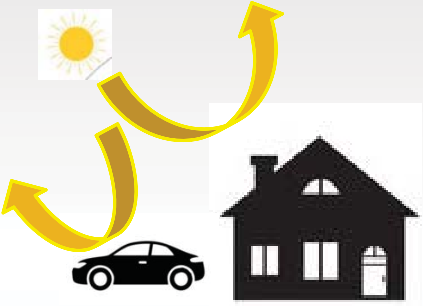
Forensic Science International: Genetics

ATR-FTIR spectroscopy combined with data manipulation as a pre-screening method to assess DNA preservation in skeletal remains

Tamara Leskovar, Irena Zupanič Pajnič, Živa Miriam Geršak, Ivan Jerman, Matija Črešnar

Case study: "Total Solar Reflectance – Energy savings"



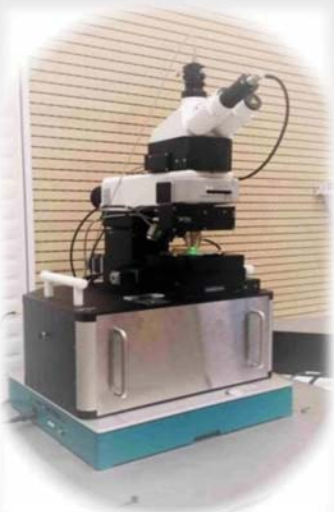
SWISSPEARL

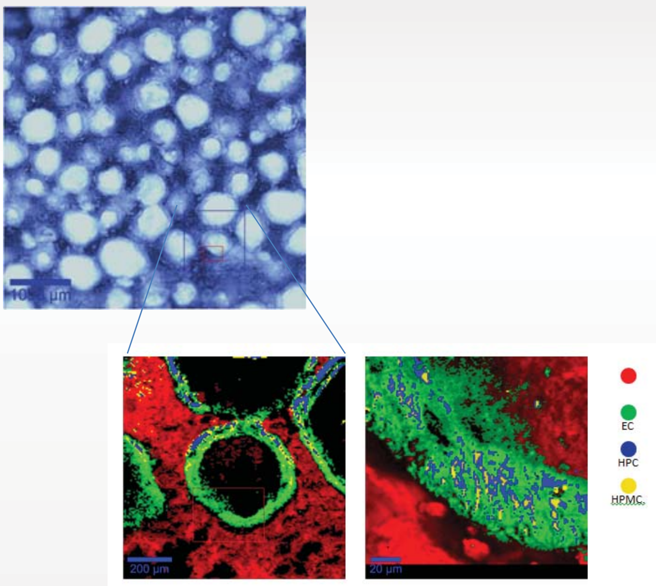
CINKARNA

AQUAFIL

JUB
Barve spremenijo dom.

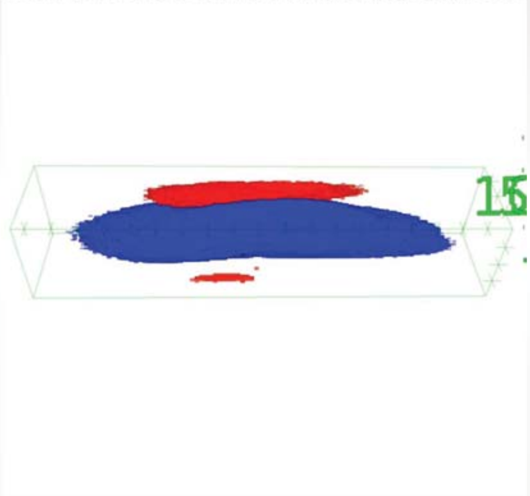
Case study: "Distribution of API in pharmaceutical products"



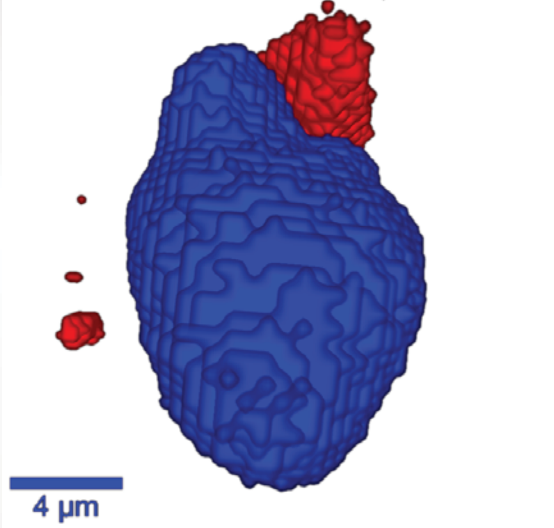


Case study: “Distribution of API in pharmaceutical products”

Result: Well-resolved Raman mapping for both components



Combine all slices into a full 3D representation



- Witec Raman rejuvenation
- Microplastics finder software
- KnowItAll software

We are here to assist you!

NATIONAL INSTITUTE OF CHEMISTRY