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About OMICS Group Conferences

OMICS Group International is a pioneer and leading science event organizer, which publishes around 400 open access journals and conducts over 300 Medical, Clinical, Engineering, Life Sciences, Phrama scientific conferences all over the globe annually with the support of more than 1000 scientific associations and 30,000 editorial board members and 3.5 million followers to its credit.

OMICS Group has organized 500 conferences, workshops and national symposiums across the major cities including San Francisco, Las Vegas, San Antonio, Omaha, Orlando, Raleigh, Santa Clara, Chicago, Philadelphia, Baltimore, United Kingdom, Valencia, Dubai, Beijing, Hyderabad, Bengaluru and Mumbai.

Laser [213-nm] depth-profiling studies of Ni/V ratios in asphaltenes (soft samples) following liquid nitrogen pre-treatment

Presented by: Dr. Avin Pillay, A&S Chemistry Dept

What are Asphaltenes?

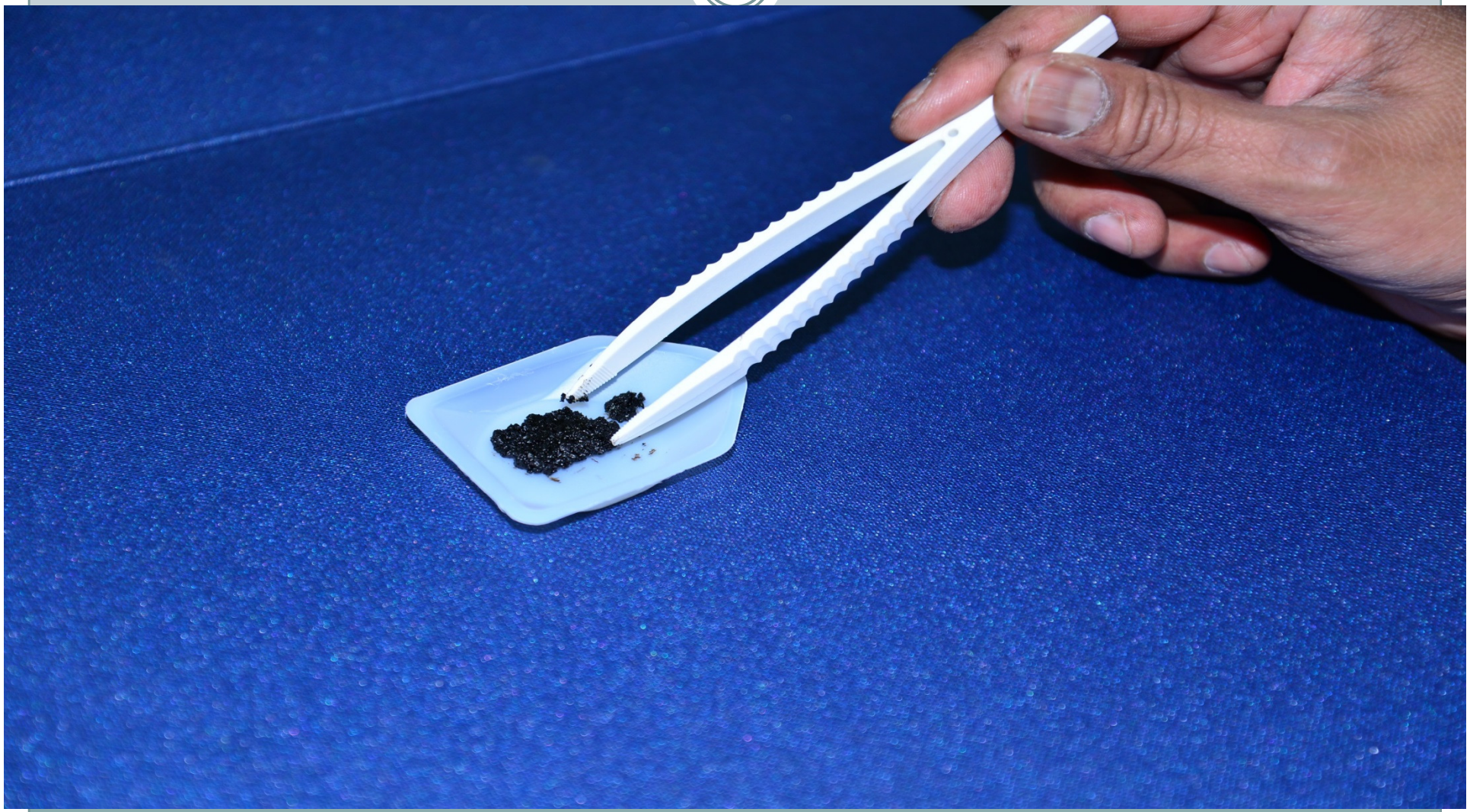
- **Crude oils** contain asphaltenes, which are a sticky, tar-like substance

- **Asphaltenes** contain nickel and vanadium, which reflect the source rock and environment from which the crude oil originates. This is important for Geochemical research. The Ni/V ratio can be obtained by a technique called **ICP-MS. Generally V levels are higher than those for Ni.**

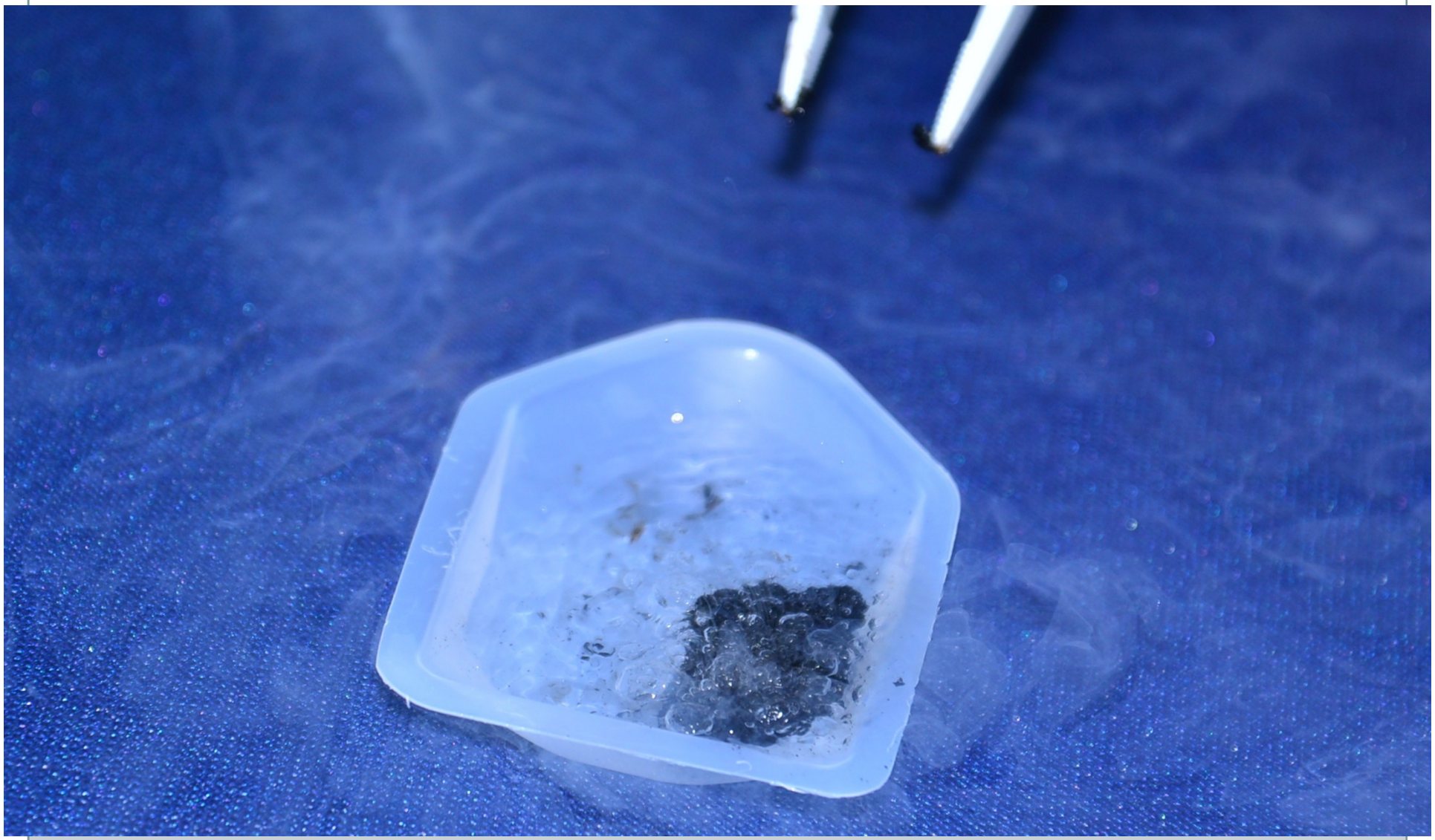
Typical Asphaltene Sample

Asphalt + Gravel = Roads

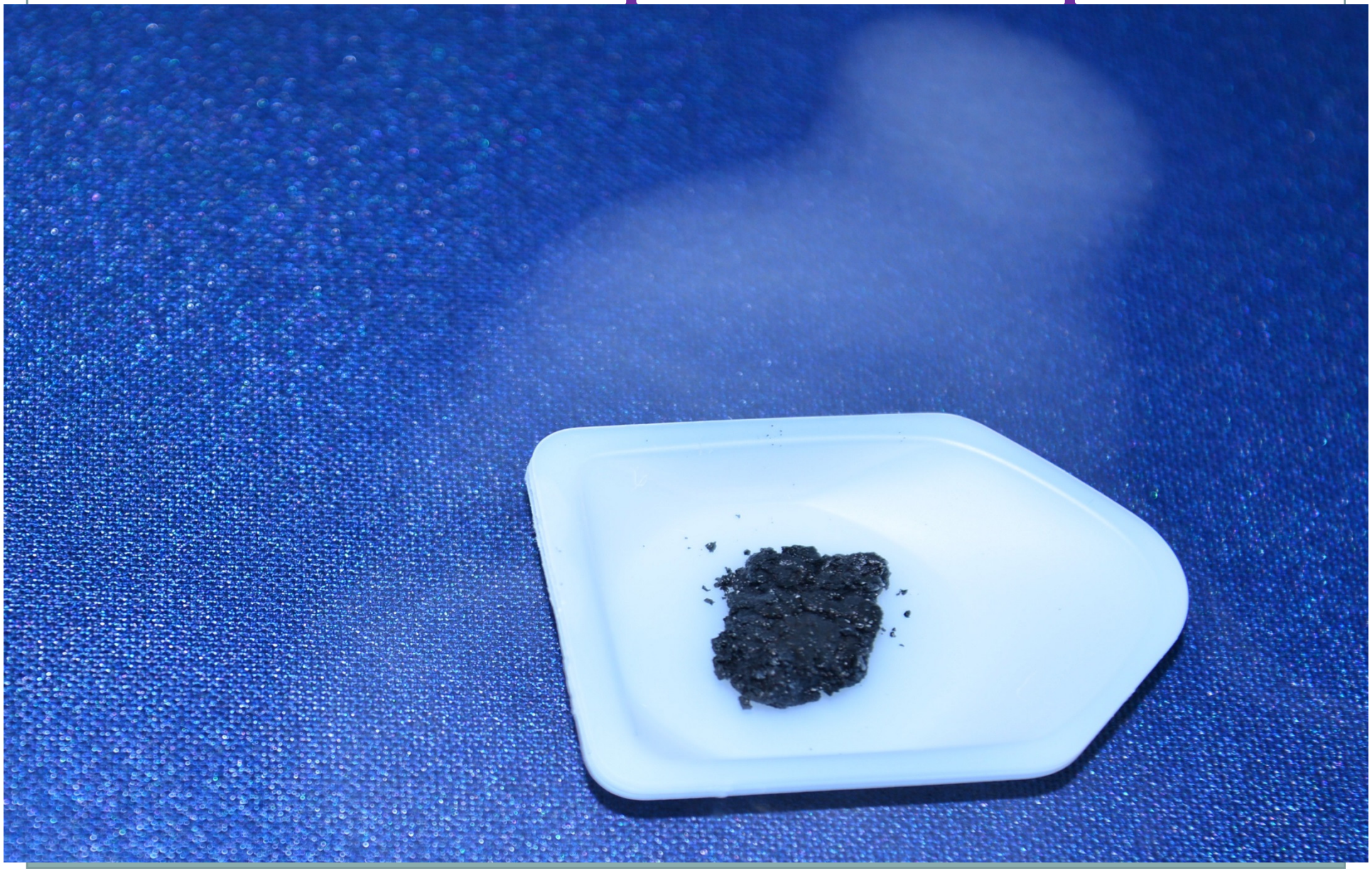
Natural sample of Asphaltene - flaky



Liquid Nitrogen Pre-treatment of sample



Solidified Asphaltene Sample



Brittle Asphaltene sample

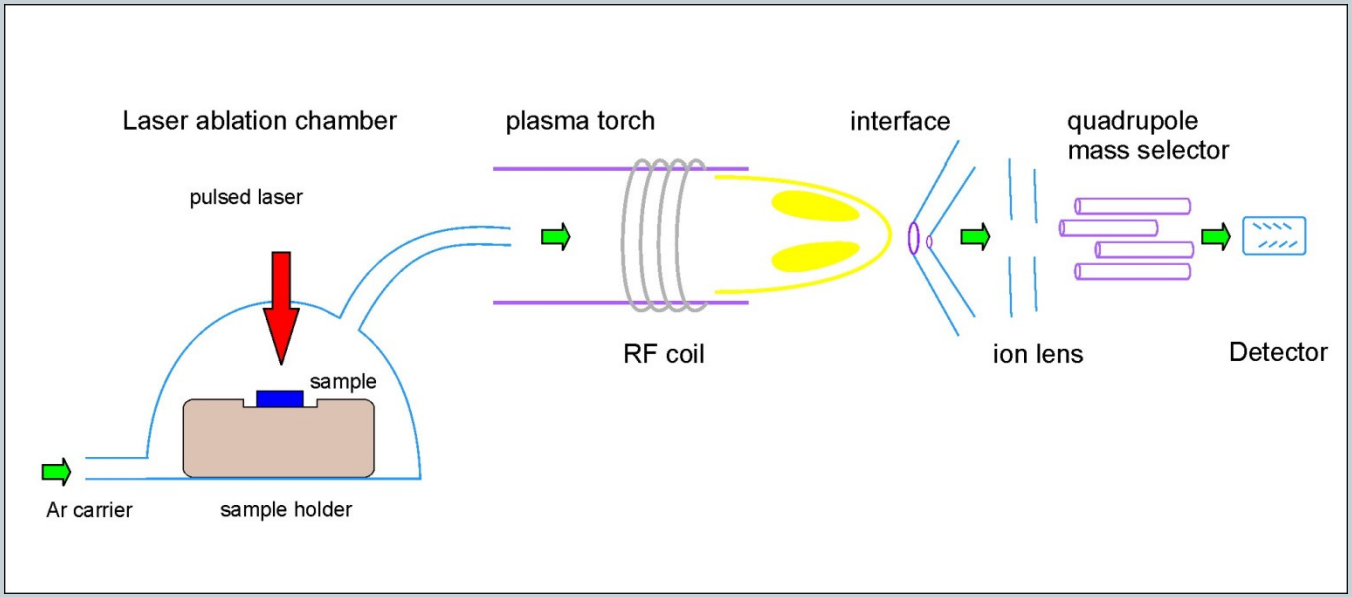
Solidified Asphaltene Sample

What is ICP-MS

- It is a highly sensitive technique that can give concentration data at the ng/kg level.

- It has the following advantages:
- Quick analysis
- Accurate data
- Easy to handle
- Sample automation

Laser Ablation ICP-MS



Validation of ICP-MS

Element	Certified value (ppb)	Measurement 1 Fluka 70007 (ppb)	Relative Error	Measurement 2 Fluka 70007 (ppb)	Relative Error
Be	10	10.20	+2.0%	10.75	+7.5%
Mg	10	9.32	-6.8%	9.92	-0.80%
Co	10	9.74	-2.6%	9.98	-0.2%
Ni	10	9.93	-0.70%	10.10	+1.0%
In	10	9.94	-0.60%	9.94	-0.60%
Pb	10	10.70	+7.0%	11.19	+11.2%
Bi	10	10.06	+0.60%	10.36	+3.6%

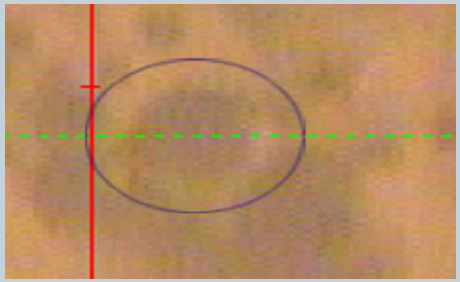
Laser Ablation

- **Laser ablation is a tool that can penetrate a solid sample at different depths and provide elemental information.**

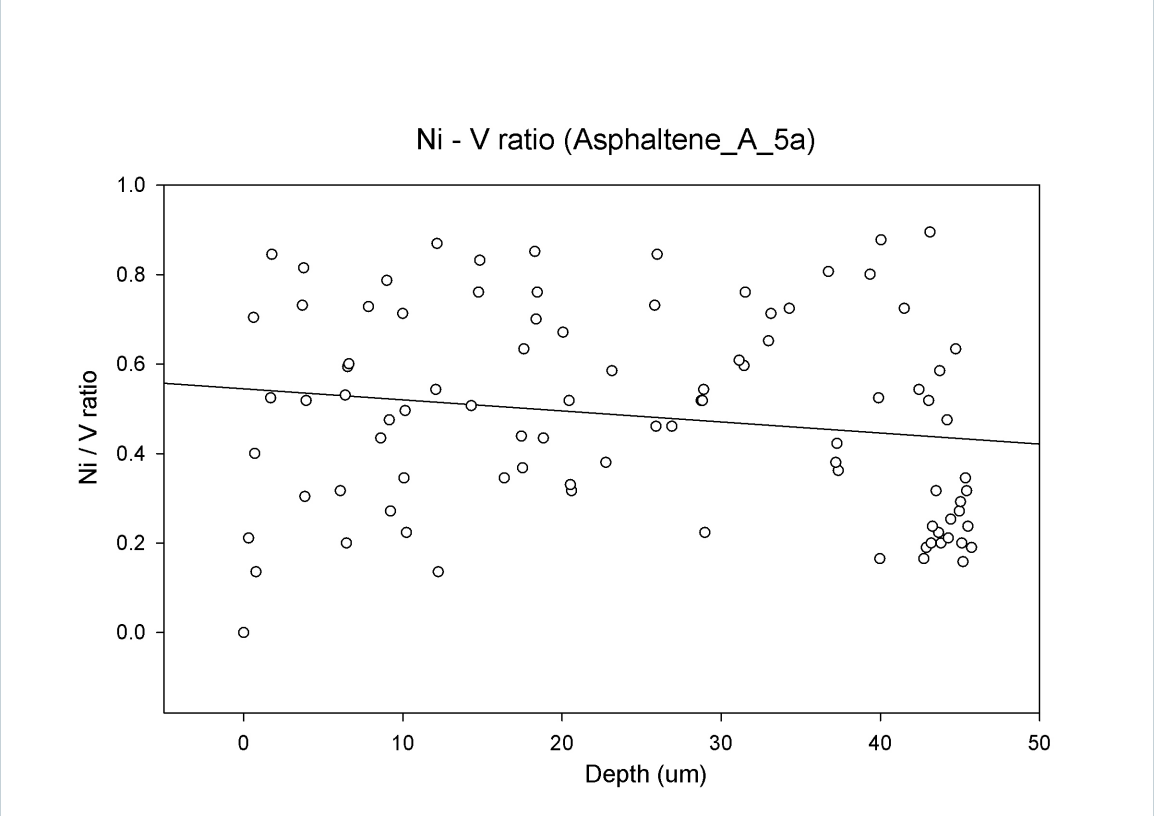
- **This type of analysis is called depth-profiling**

Screen-shot of “splashing” effects in a gelatinous or soft sample

Screen shot of crater-formation



Ni/V Ratio vs Laser Depth



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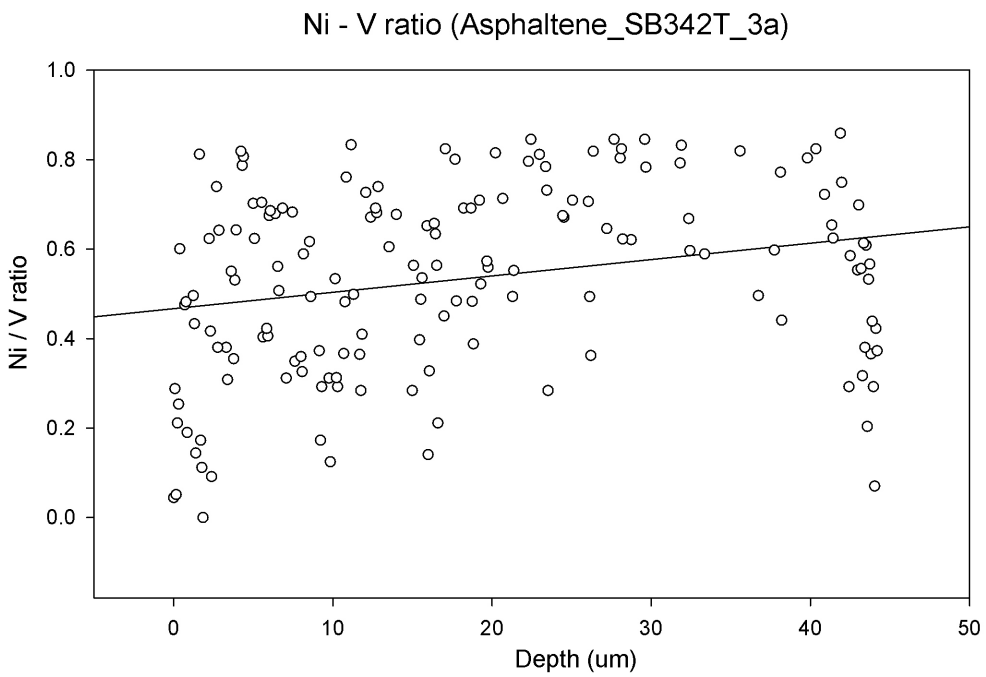
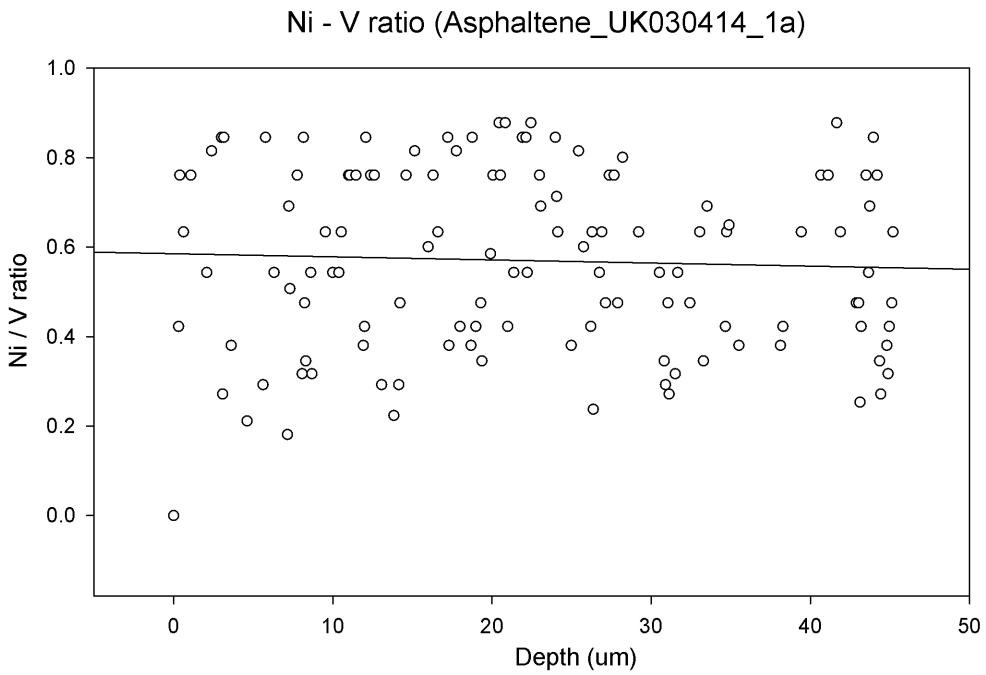


Ni/V Ratio vs Laser Depth



Digested Asphaltenes

- For Abu Dhabi oilfields a Ni/V ratio of 0.5 is ideal
- Digested samples produced values reflecting much higher nickel content
- This indicated there was some nickel contamination due to nickel casings of the pipelines.
- In laser ablation studies we can remove the outliers, in heterogeneous samples.

THANK YOU

- **The Petroleum Institute and technical staff of the Chemistry Department is gratefully acknowledged**

- **Collaborators: Mr Sasi Stephen; Mr Amr Abd Elhameed**

Let Us Meet Again

We welcome you all to our future conferences of OMICS Group International

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Contact us at

materialsscience.conference@omicsgroup.us

materialsscience@omicsgroup.com