

10th International  
**COLLOIDS CONFERENCE**  
ONLINE – Live and On-demand

7–9 December  
**2020**

## Certificate of Presentation

I hereby confirm that

**Andrei Novikov**

**Attended The Online 10<sup>th</sup> International Colloids Conference**

**7-9 December 2020**

**and presented**

**Hydrotropes at water/oil interface: adsorption and critical phenomena**



**Hannah Griffiths**

**For and on behalf of Elsevier Ltd**

Чтв, 26 Мар 2020 18:11

# 10th International Colloids Conference: Abstract acceptance letter



От: COLL 2020 &lt;content-coll2020@elsevier.com&gt;

Кому: novikov.a@gubkin.ru &lt;novikov.a@gubkin.ru&gt;



## Poster acceptance letter

10<sup>th</sup> International Colloids Conference

6-9 December 2020 | Mallorca, Spain

**Abstract reference no.: COLL2020\_0495 (Please quote in all correspondence)**

26 March 2020

Dear A. Novikov,

Thank you for submitting a paper to present at the 10<sup>th</sup> International Colloids Conference. On behalf of the Organising Committee, I am delighted to inform you that your abstract titled '**Hydrotropes at water/oil interface: adsorption and critical phenomena**', has been accepted for **poster presentation**. Abstracts of an extremely high standard were submitted to the conference and we believe we have selected an excellent mix of abstracts to address the conference themes. We very much look forward to your presentation.

The details of your presentation are as follows:

<b>Title:</b>	<b>Hydrotropes at water/oil interface: adsorption and critical phenomena</b>
<b>Authors:</b>	<b>A. Novikov, A. Kuchierskaya, V. Kuryakov, A. Semenov</b>
<b>Presenting Author:</b>	<b>A. Novikov</b>

Please check the above details of your presentation carefully as all conference material will be printed with this information. If there are any corrections, please inform me as soon as possible.

### Poster Presentations

You will be informed of your session date, time and poster number and the poster dimensions in due course.

Please bookmark the conference website <https://www.elsevier.com/events/conferences/international-colloids-conference/about> to keep up-to-date with changes as they occur.

It is a condition of abstract acceptance that you or a nominated presenting co-author registers for the conference by the **author registration deadline of 2<sup>nd</sup> October 2020.**

The abstracts of all unregistered presenters will not be included in the programme after this date. Should the addressee above not be the nominated presenter, please inform me of the name and email address of the presenter immediately [content-coll2020@elsevier.com](mailto:content-coll2020@elsevier.com).

To register to attend the conference, please follow this link: <http://conferences.elsevier.com/COLL2020?email=novikov.a@gubkin.ru&abstracts=0495>

Registration is available online using a credit card. Registration rates are as follows:

Student registration	EUR 365 + 21% VAT = EUR 441.65
Early bird author / academic	EUR 600 + 21% VAT = EUR 726
Standard author / academic	EUR 700 + 21% VAT = EUR 847
Early bird industry registration	EUR 710 + 21% VAT = EUR 859.10
Standard rate industry	EUR 810 + 21% VAT = EUR 980.10
<a href="#">Conference dinner</a>	EUR 70 + 21% VAT = EUR 84.70

All authors will be responsible for their own travel and accommodation expenses. The conference organisers do not have funds available to support the attendance of individual delegates.

- [The registration system is different to the abstract submission system; click on the link provided. Register as a 'New Customer' in the registration system if you have not attended an Elsevier conference before.](#)
- Your registration will not be confirmed until you have organised payment. We accept payment by credit card only. We are unable to raise invoice for bank transfers.
- When registering please state your abstract number COLL2020\_0495 when asked for your reference number. If you have more than one presentation accepted, please list all abstract reference numbers.
- If you face any difficulties with the registration system, please contact our Customer Support team [ConferenceCS@elsevier.com](mailto:ConferenceCS@elsevier.com)

***We understand you may be concerned about not being able to attend due to the corona virus situation. Rest assured that we will refund your registration fee, with no penalty, should you wish to cancel during the uncertainty of the outbreak.***

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**Cancellation information:**

Substitutions may be made at any time but please advise us of a change of name. If you find it necessary to cancel the registration completely, please [notify us](#) immediately. (Please do not email credit card information under any circumstances).

Provided written notice is received by 1 May 2020, a full refund will be given less a 10% administration charge. Provided written notice is received by 15 May 2020, a 50% refund will be given. Please note, registrations cancelled after 15 May 2020 or for no-shows at the conference, the full fee (100% cancellation charges) will be payable.

Please be advised that your registration fee does not include travel insurance, please ensure that you have your own insurance policy before travelling.

In the unlikely event that Elsevier shall deem it necessary to cancel the conference, all pre-paid registration fees will be reimbursed. Elsevier shall not be liable for reimbursing the cost of travel or accommodation arrangements made by individual delegates.

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**Accommodation**

Rooms have been reserved at the conference hotel at specially negotiated rates for use by delegates.

To book and for more details please access the accommodation page on the website:

<https://www.elsevier.com/events/conferences/international-colloids-conference/location/accommodation>

**Conference Publications**

Upon arrival at the conference all delegates will receive a programme overview. Prior to the conference all delegates will be sent a link to a secure online system, to access to the programme, all accepted abstracts, speaker biographies and other detailed conference information.

Please do not hesitate to contact me if you have any queries and I look forward to receiving your completed registration.

Yours sincerely,

Reshma Murali

Conference Content Executive

10<sup>th</sup> International Colloids Conference

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# 10th International COLLOIDS CONFERENCE

Melia Palma Bay and Palau de Congressos de Palma,  
Mallorca, Spain

14–17 June  
2020

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## ABSTRACT SUBMISSION

**Title:** Hydrotropes at water/oil interface: adsorption and critical phenomena

**Abstract No.** 0495

**Title** Hydrotropes at water/oil interface: adsorption and critical phenomena

**Abstract** [Novikov-et-al\\_10th\\_Colloid\\_Conference-AN2.doc](#)

**Template used** Yes

### Text Abstract

#### Introduction:

Hydrotropes are substances comprised of small amphiphilic molecules, which increase the solubility of hydrophobic substances in aqueous solutions. In contrast to surfactants, hydrotropes do not form stable micelles in aqueous solutions, only short-living non-covalent molecular clusters.

In this work, we have studied the ternary systems containing water, nonpolar organic solvent ("oil"), and hydrotrope (alcohol).

#### Methods:

The samples were prepared gravimetrically (Ohaus PA413C, Parsippany, NJ, USA) in custom-made jacketed cells with an inverted ground joint and a PTFE-coated magnetic stirrer. The temperature was controlled by a water circulation bath (Julabo F25ME, Germany). The interfacial tension between the aqueous and oil phases was measured by the Wilhelmy plate (Kruss K20, Germany) and spinning drop (Kruss SDT, Germany) methods. The equilibrated phases' densities were measured by the oscillating tube method (Anton Paar DMA35 Ex Petrol, Austria). The correlation length was measured by dynamic light scattering (Photocor Complex, Russia).

#### Results:

We obtained dependences of the interfacial tension on the fraction of hydrotrope in aqueous and oil phases. In the near-critical regions, for the first time to our knowledge, we successfully measured both interfacial tension and correlation length in the same samples.

#### Discussion:

At low concentrations, the interfacial tension decreases following the Langmuir-von Szyszkowski isotherm because of the hydrotrope's adsorption. However, at higher concentrations, the interfacial tension should be described by the crossover isotherm accounting for the critical region behavior. Near the critical point, we confirmed the linear dependence of inversed correlation length from the square root of interfacial tension.

#### Acknowledgments:

This work was supported by the Ministry of Education and Science of the Russian Federation (Grant № 14.Z50.31.0035).

**Full Abstract  
App Permission** No

**App** Yes

**Approval** Confirm

**Copyright** Yes

**Affiliations** (1) Gubkin University, n/a, Russia  
(2) Oil and Gas Research Institute of RAS, n/a, Russia

**Authors** A. Novikov (1) Presenting  
A. Kuchierskaya (1)  
V. Kuryakov (1) (2)  
A. Semenov (1)

**Presenter email** novikov.a@gubkin.ru

**Gender** Male

**Categories** Other

**Other theme** New theory, novel phenomena and advanced experimental techniques

**Keyword1** correlation length

<b>Keyword2</b>	interfacial tension
<b>Keyword3</b>	phase equilibria
<b>Keyword4</b>	adsorption isotherm
<b>Status</b>	3. Junior academic (e.g. lecturer, assistant professor)
<b>Scientific publication</b>	Yes
<b>Last published paper details</b>	Novikov, A. A., Semenov, A. P., Kuchierskaya, A. A., Kopitsyn, D. S., Vinokurov, V. A., & Anisimov, M. A. (2019). Generic nature of interfacial phenomena in solutions of nonionic hydrotropes // Langmuir. 35, 13480-13487. DOI:10.1021/acs.langmuir.9b02004
<b>Full title of article</b>	Generic nature of interfacial phenomena in solutions of nonionic hydrotropes
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<b>DOI</b>	10.1021/acs.langmuir.9b02004
<b>Presentation</b>	Oral
<b>AV requirements</b>	Computer projection
<b>Registration</b>	Confirm

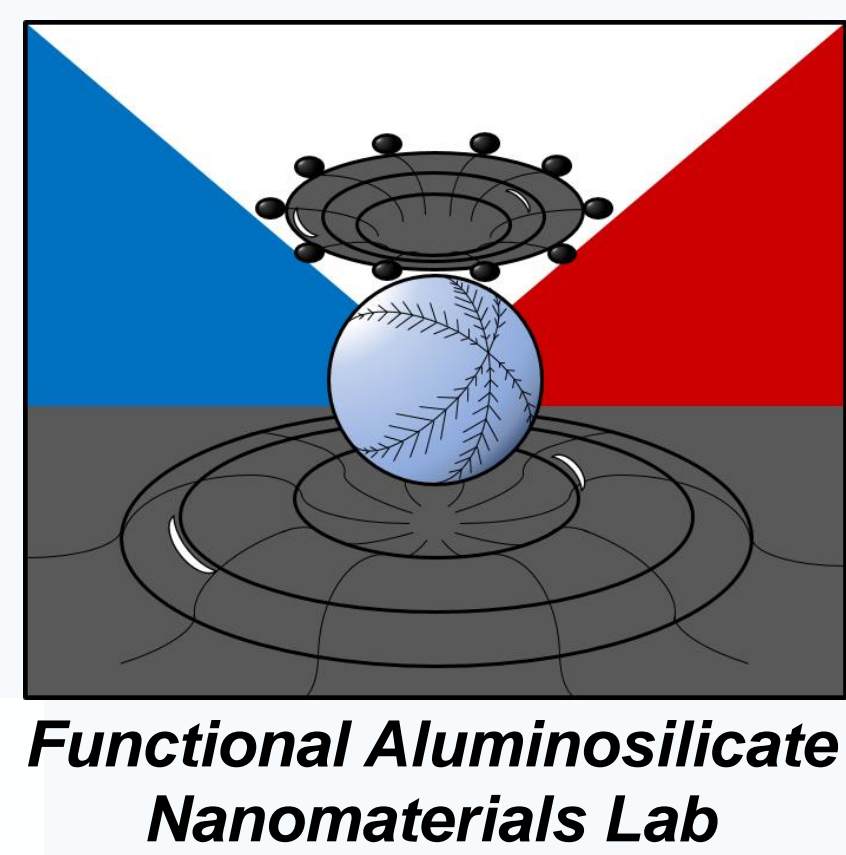
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# Hydrotropes at water/oil interface: adsorption and critical phenomena



Andrei Novikov<sup>1</sup>, Alexandra Kuchierskaya<sup>1</sup>,  
Vladimir Kuryakov<sup>1,2</sup>, Anton Semenov<sup>1</sup>

<sup>1</sup>Functional Aluminosilicate Nanomaterials Lab, Gubkin University, Moscow, Russia;

<sup>2</sup> Oil and Gas Research Institute of RAS (OGRI RAS), Moscow, Russia

e-mail: [novikov.a@gubkin.ru](mailto:novikov.a@gubkin.ru)

## Interfacial tension isotherms:

### Langmuir – von Szyszkowski:

$$\gamma/\gamma_0 = \Psi_1 = 1 - a_1 \ln(1+a_2x)$$

### Near-critical behavior:

$$\gamma/\gamma_0 = \Psi_2 = a_3 \cdot [(x_{crit}-x)/x]^\mu$$

$\mu$  is a universal critical exponent:  
 $\mu = 2\nu/\beta = 1.26/0.326 = 3.865$

### Crossover isotherm:

$$\gamma/\gamma_0 = \Psi_1 \Psi_2 / (\Psi_1 + \Psi_2),$$

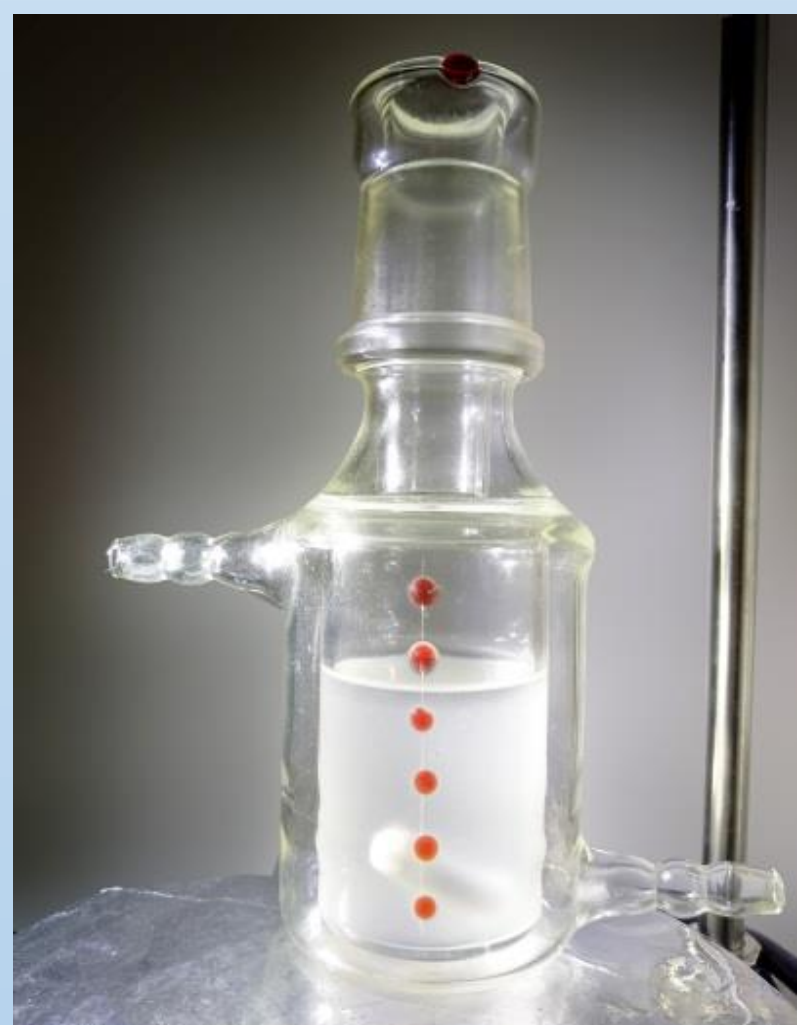
where

$$\Psi_1 = 1 / (1 + a_1x) \text{ for CHX, TOL;}$$

$$\Psi_1 = 1 / (1 + a_1x + a_2x^3) \text{ for DEC}$$

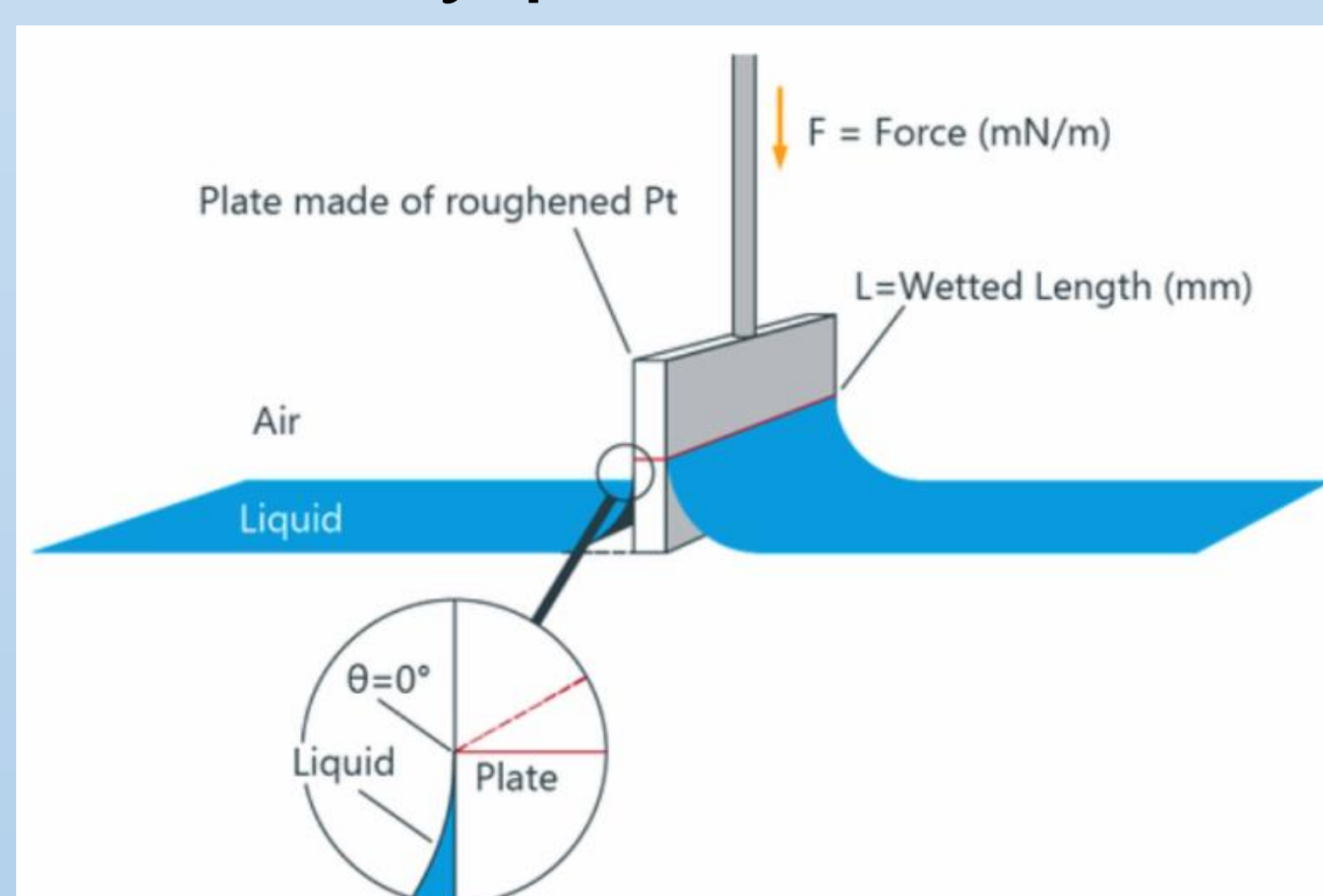
(Novikov et al., 2019 DOI:10.1021@acs.langmuir.9b02004)

## Experimental



Custom-made jacketed cell for sample preparation

### Wilhelmy plate method:

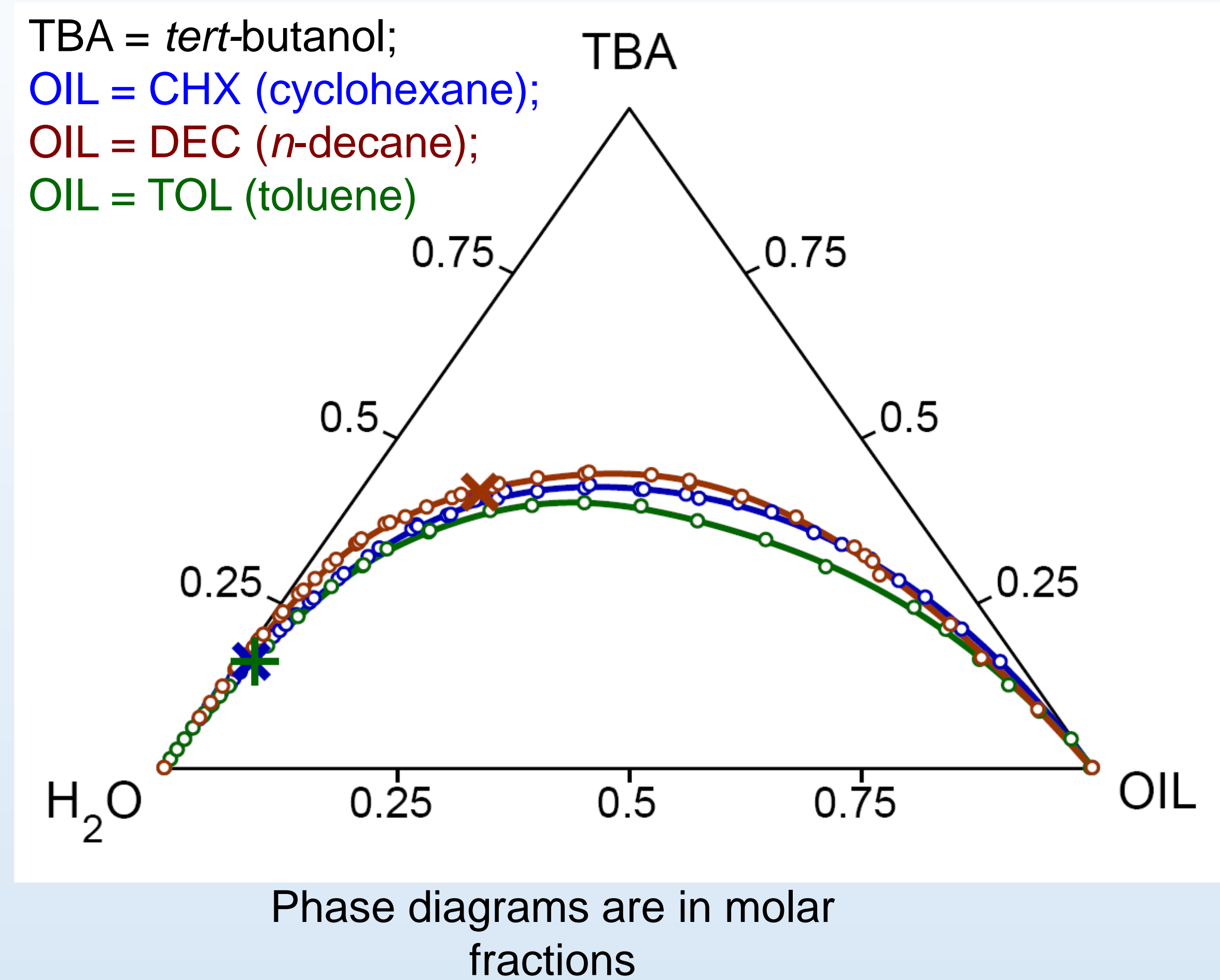


### Spinning drop method:

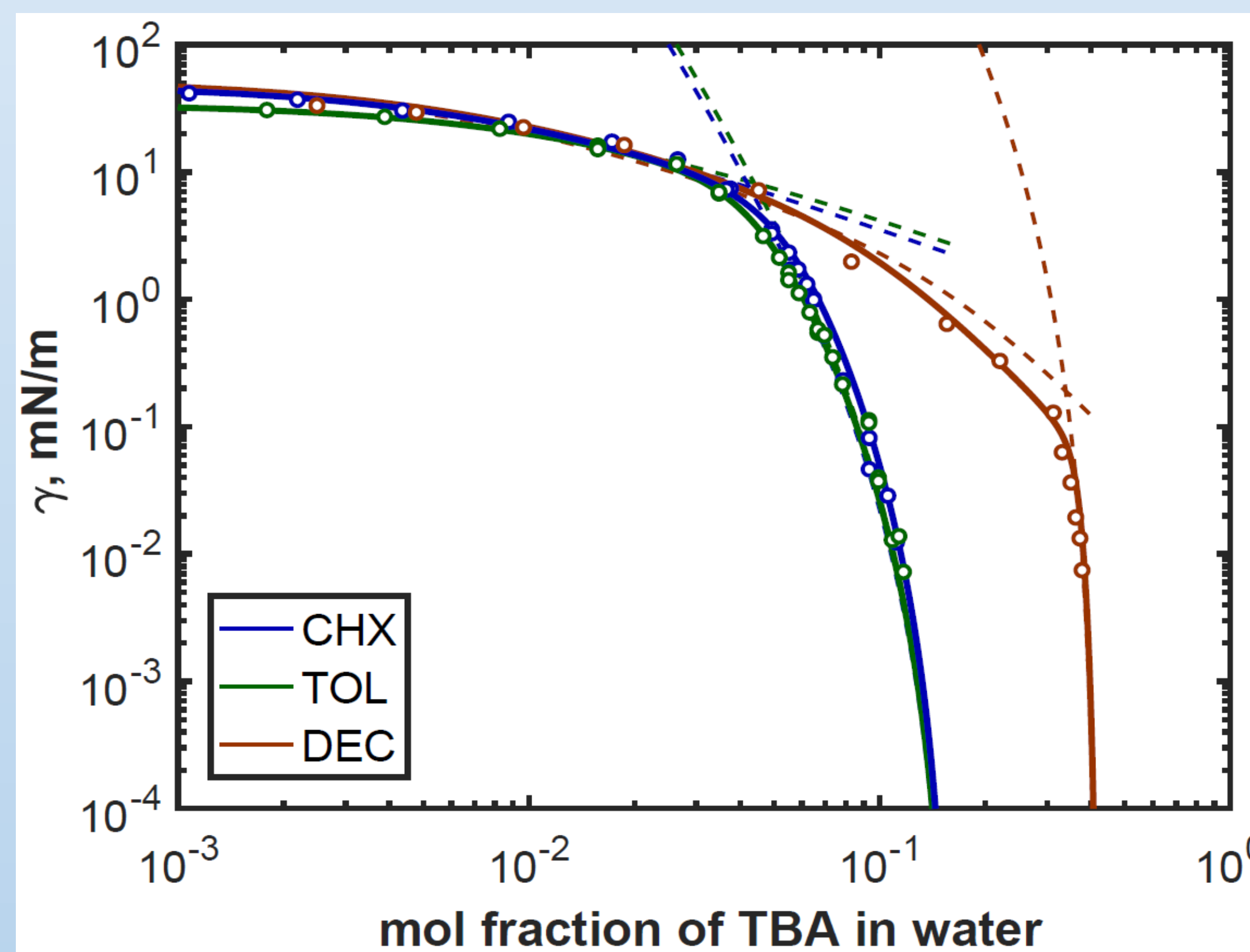


## Results

With different “oils”, phase diagrams look similar, only the CP shifts with the enlargement of the “oil” molecule size.

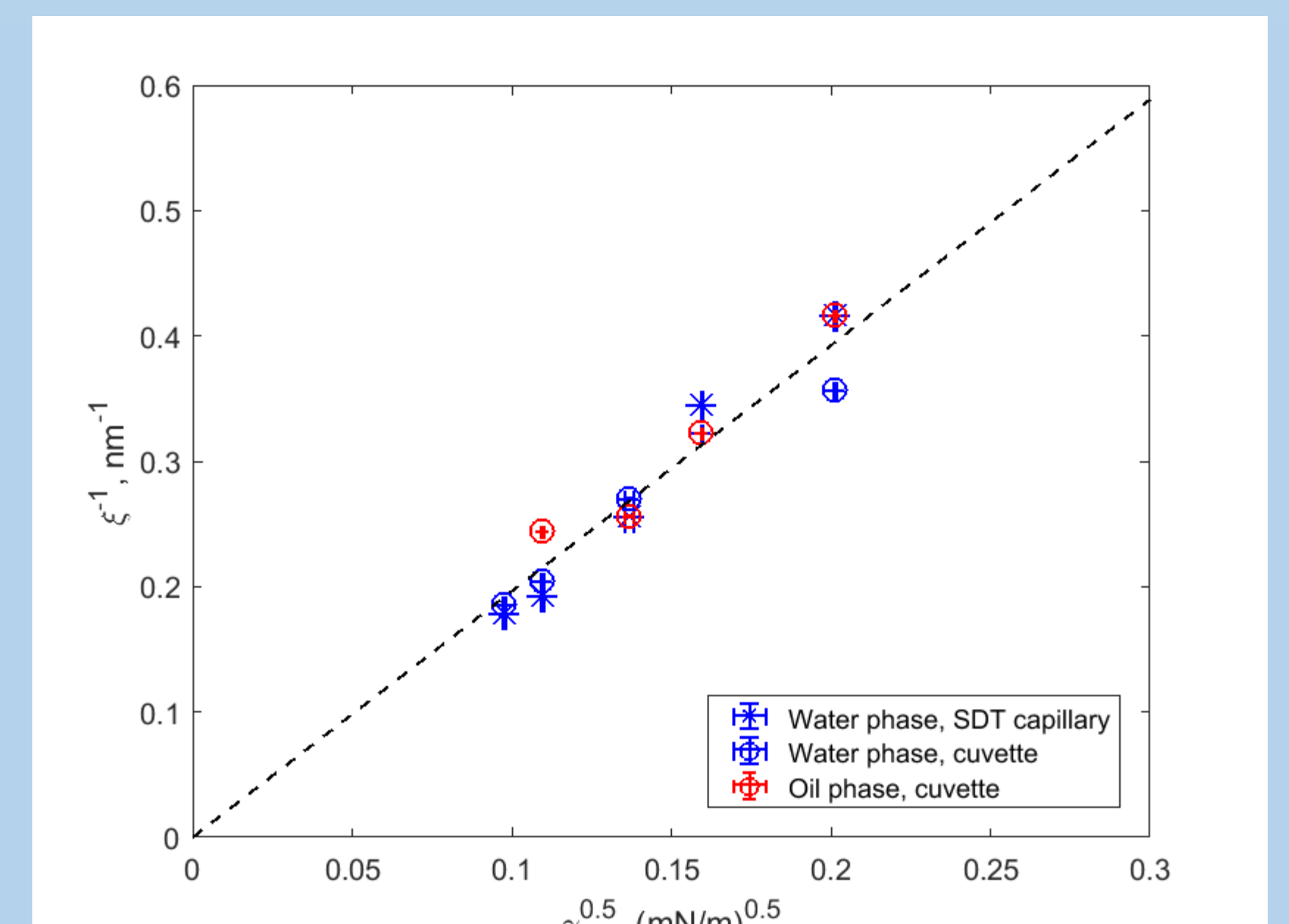


## Interfacial tension isotherms:



The interfacial tension is well described by the crossover isotherm accounting for the critical region behavior.

In the near-critical regions, for the first time to our knowledge, we successfully measured both interfacial tension and correlation length in the same samples.



## Conclusions

The crossover isotherm successfully describes interfacial tension in various ternary systems. In the near-critical region, interfacial tension corresponds to correlation length, in accordance with scaling theory.