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Unidad de Materiales



SAMAN
Simplification Analytical,
Miniturization and Nanotechnologies



GREENCHEM
Unidad de Química Sostenible



UNIDEA
Unidad de Alimentos



**SERVICIO DE
INSTRUMENTACIÓN**
Unidad de instrumentación y apoyo
a la investigación

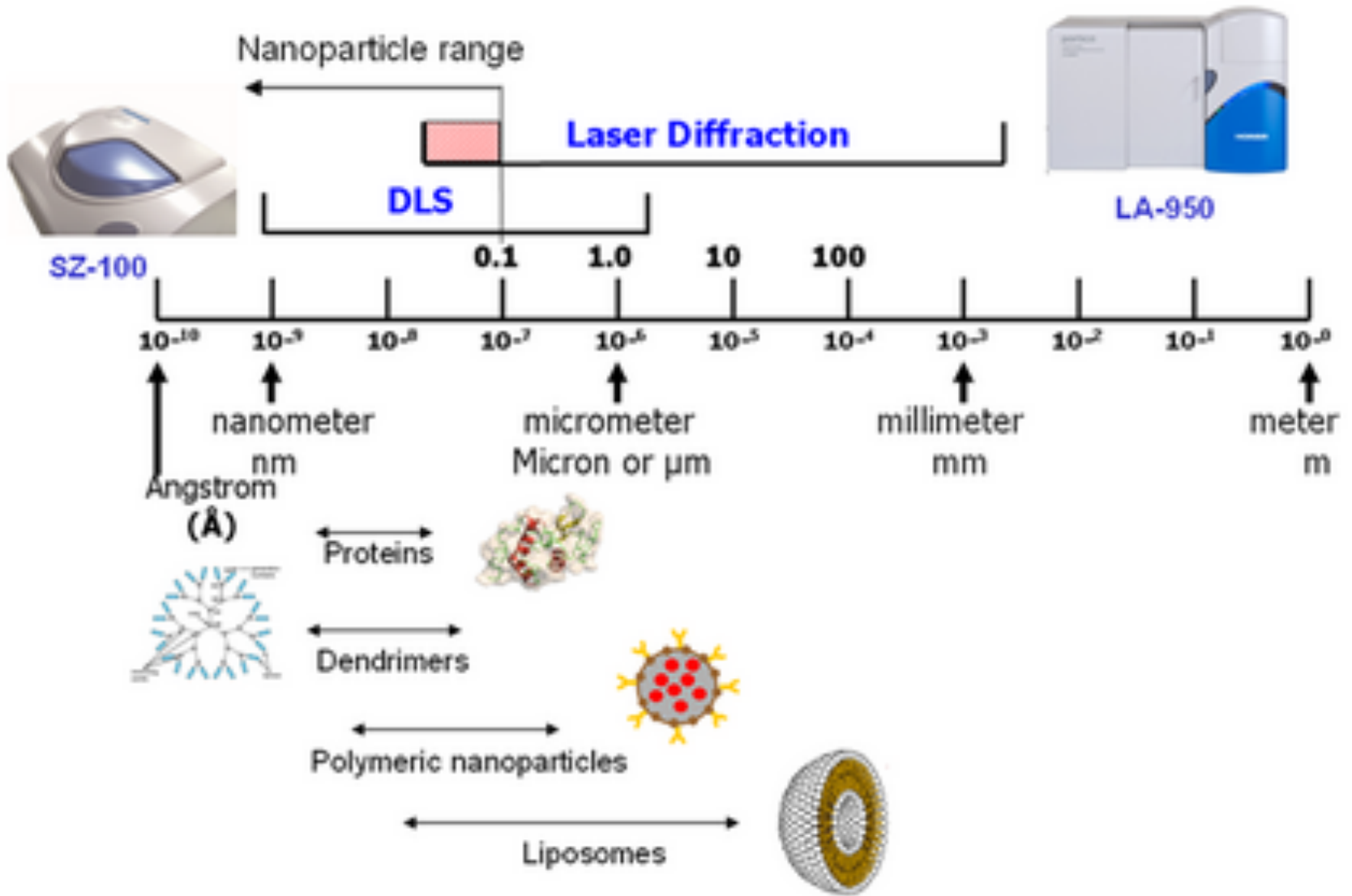
 **IRICA**



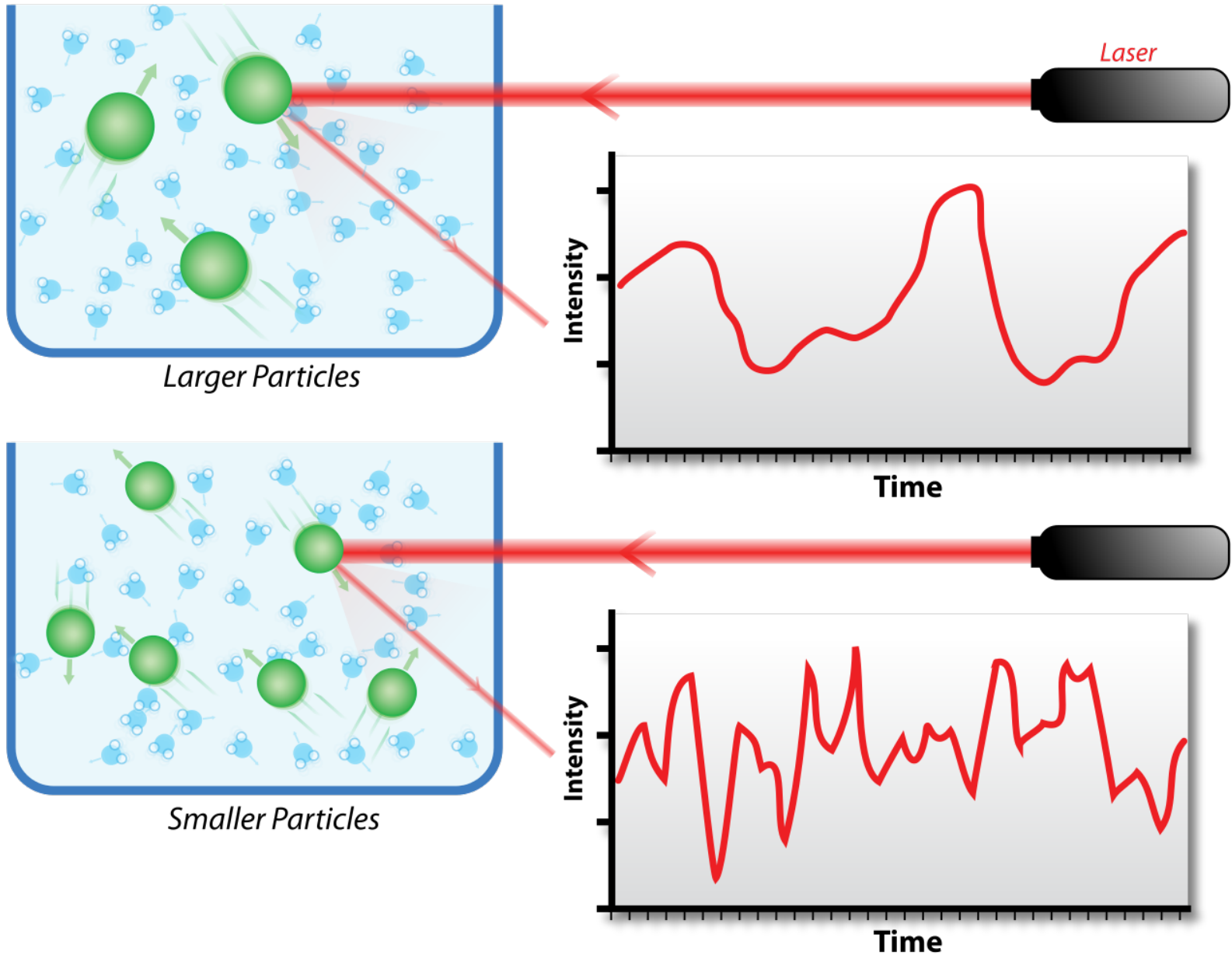
DINAMIC LIGHT SCATTERING (DLS)/Z-POTENTIAL



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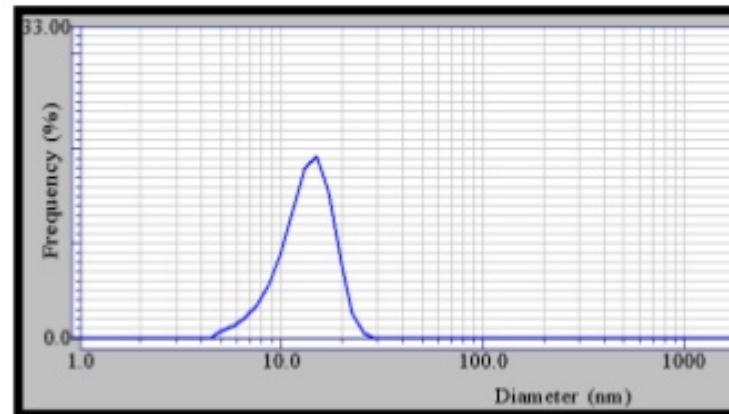
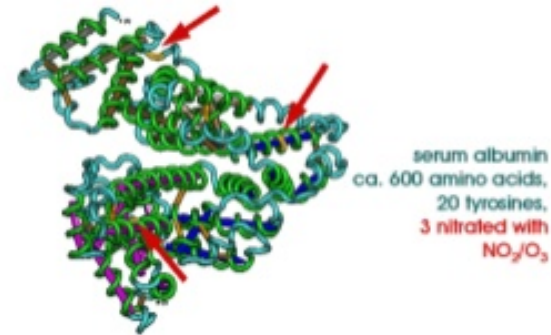


DINAMIC LIGHT SCATTERING (DLS)



2mg/mL filtered BSA

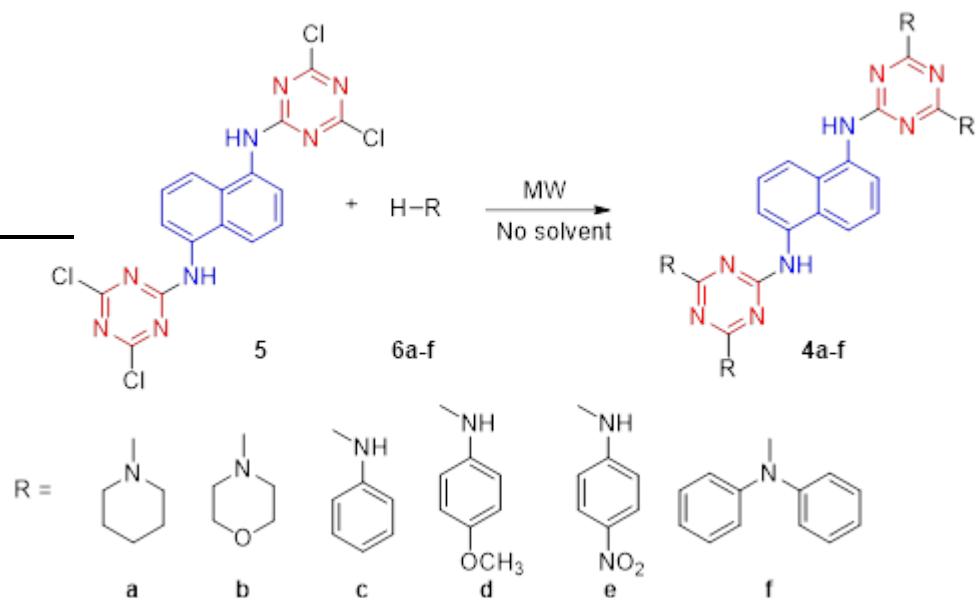
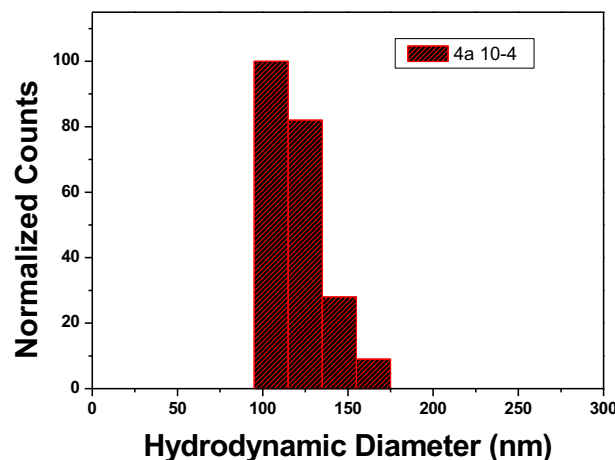
- BSA- well characterized protein
- DLS – Can be used to determine the **aggregation state** of the protein



APLICACIONES DLS

Hydrodynamic diameters of 1,5-diaminonaphthalene bistriazines 4.

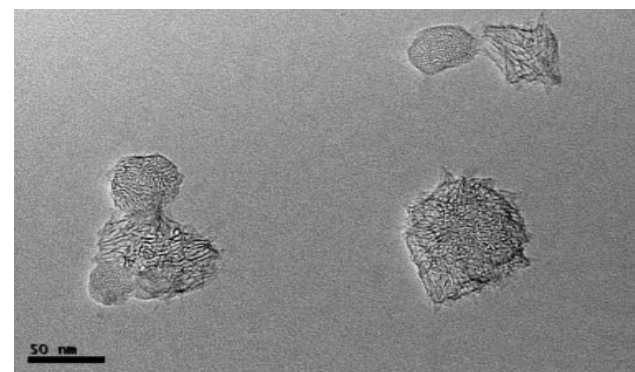
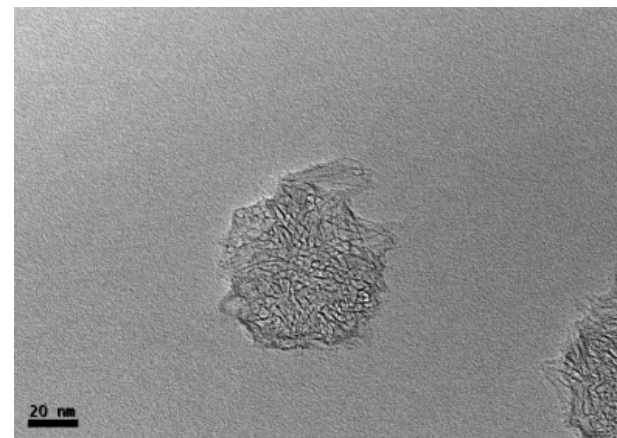
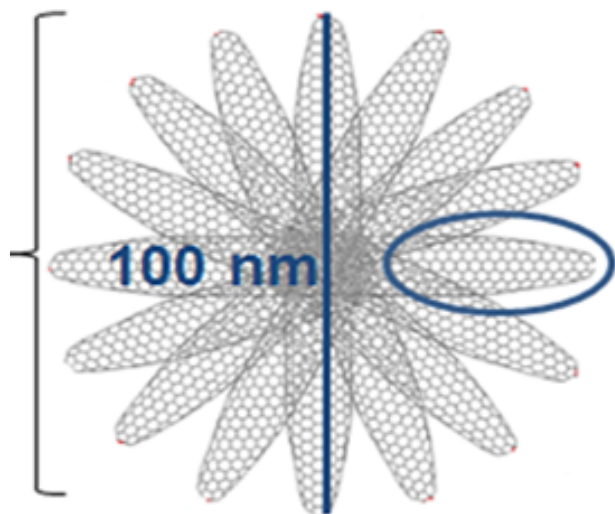
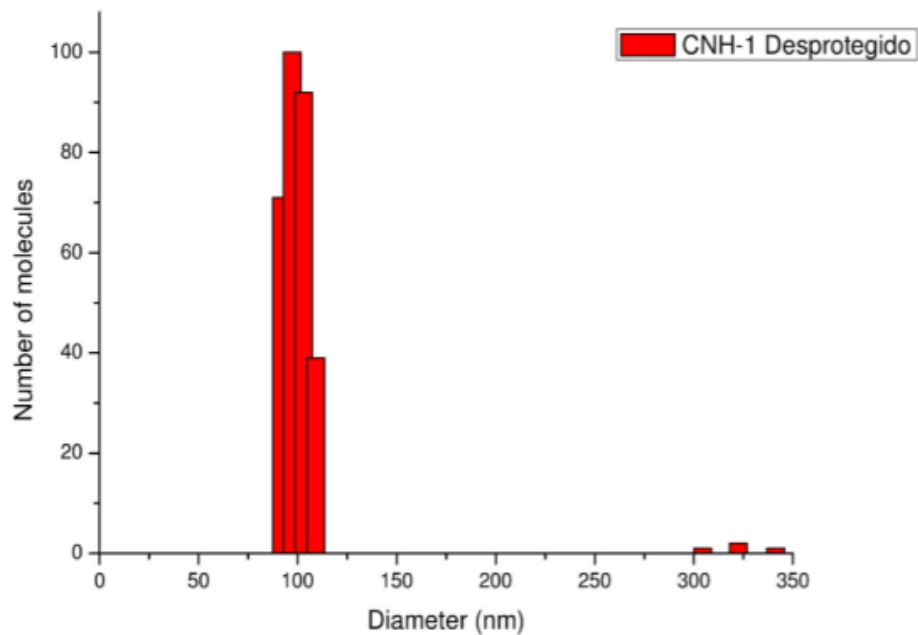
	[4] M	Solvent	Hydrodynamic diameter
4a	10 ⁻⁴ M	THF	112 nm ± 16
	10 ⁻⁵ M	THF	120 nm ± 21
4d	10 ⁻⁴ M	THF	103 nm ± 33
	10 ⁻⁶ M	THF	134 nm ± 26
4e	10 ⁻⁵ M	THF	115 nm ± 11
4f	8*10 ⁻⁴ M	CH ₂ Cl ₂	75 nm ± 20



Synthesis of bistriazines **4a-f** with a naphthalene spacer.

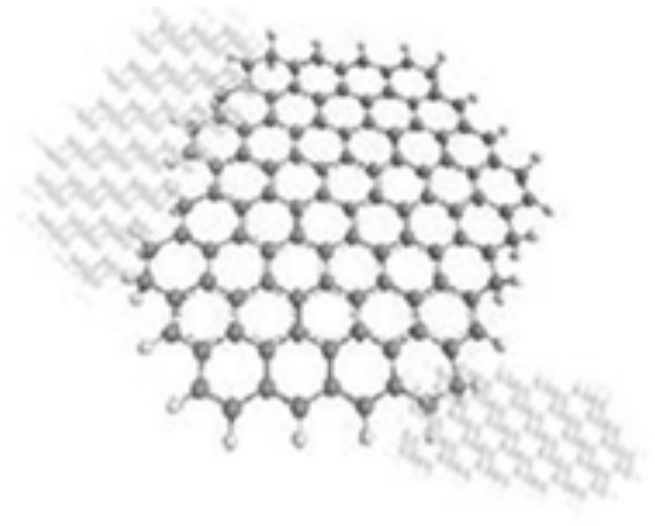
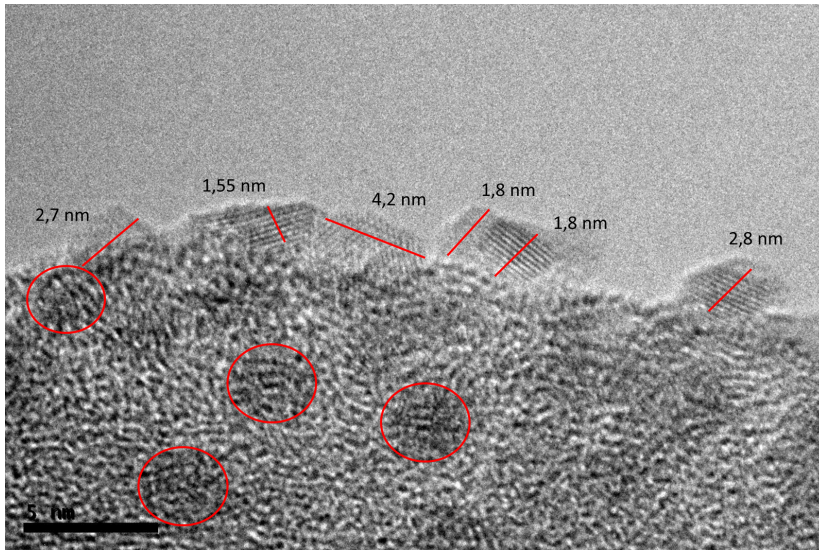
Fig. 6. Dynamic Light Scattering (DLS) of **4a** in THF (10⁻⁴ M), hydrodynamic diameter = 112 nm.

APLICACIONES DLS



Muestra del derivado CNH-1 TEM a escala de 20 nm, 50 nm respectivamente.

APLICACIONES DLS

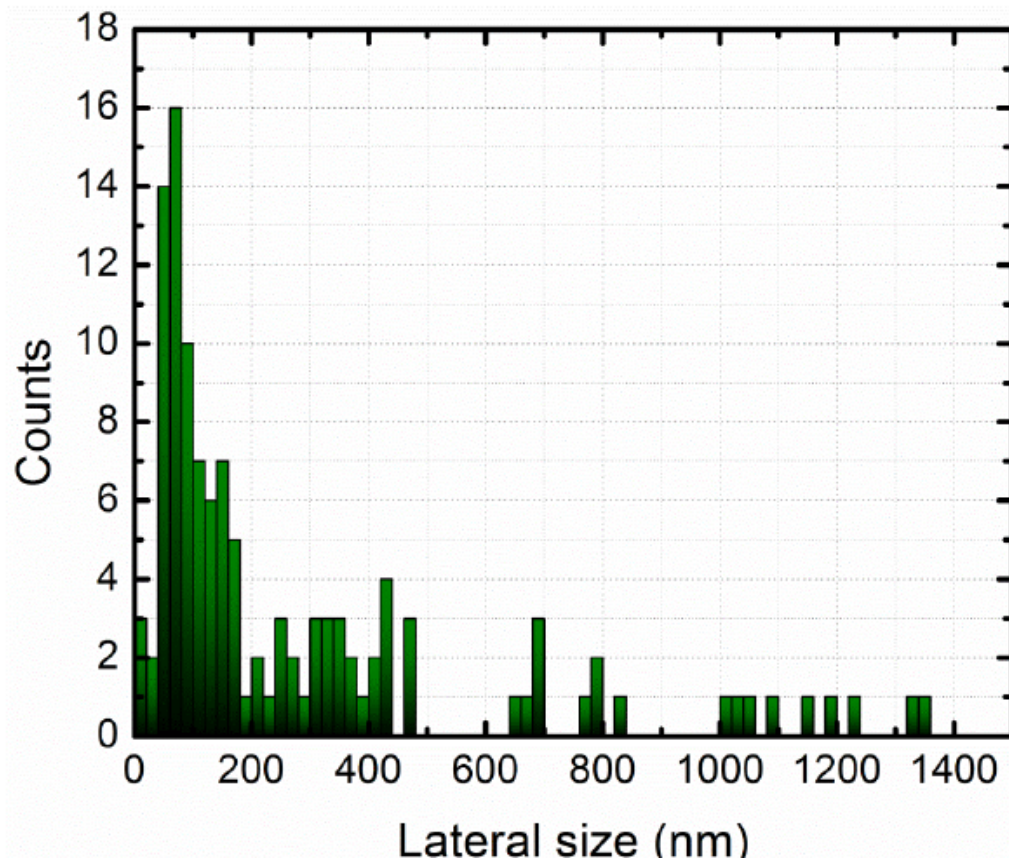


GQDs

APLICACIONES DLS

Graphene oxide from GANF

TEM



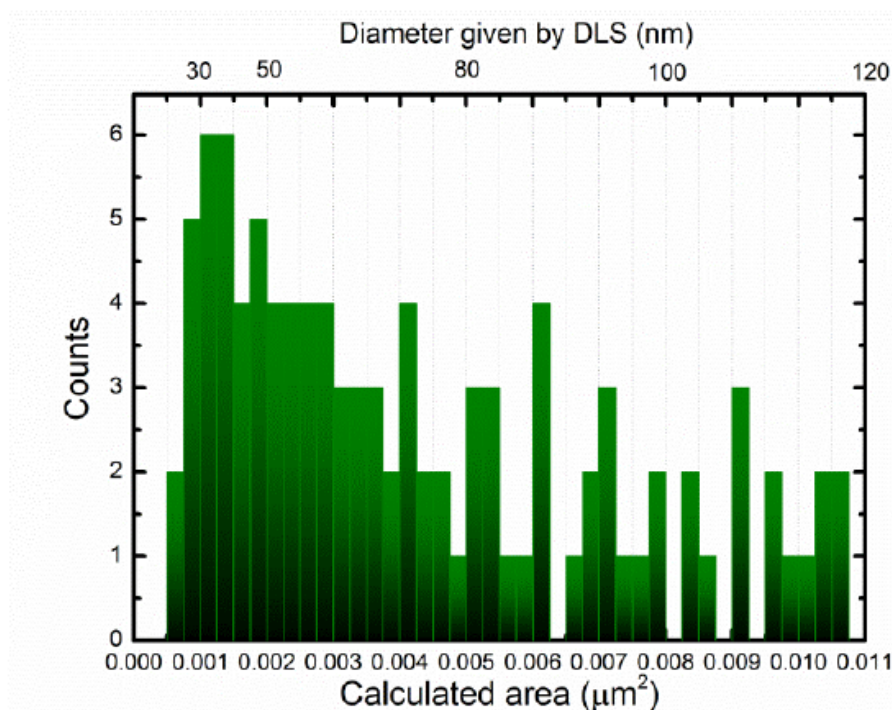
APLICACIONES DLS

DLS

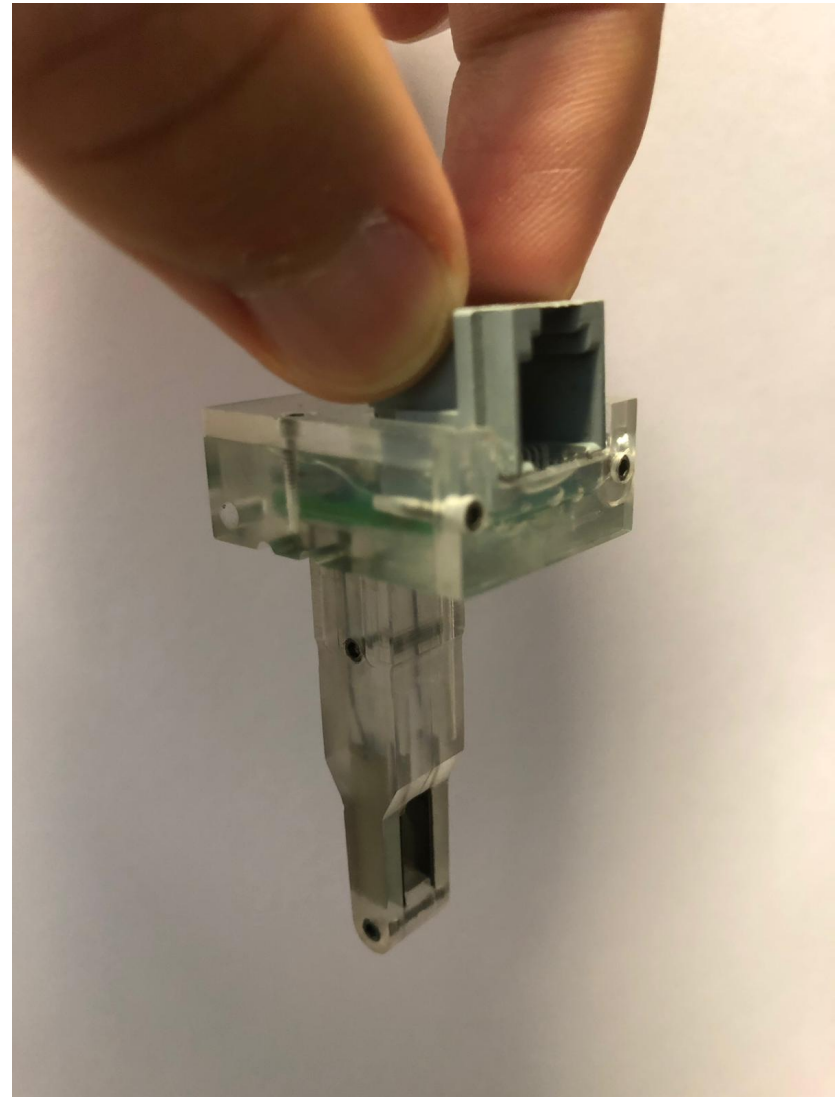
Approximation of the size distribution.

Carried out in BIC 90Plus analyzer

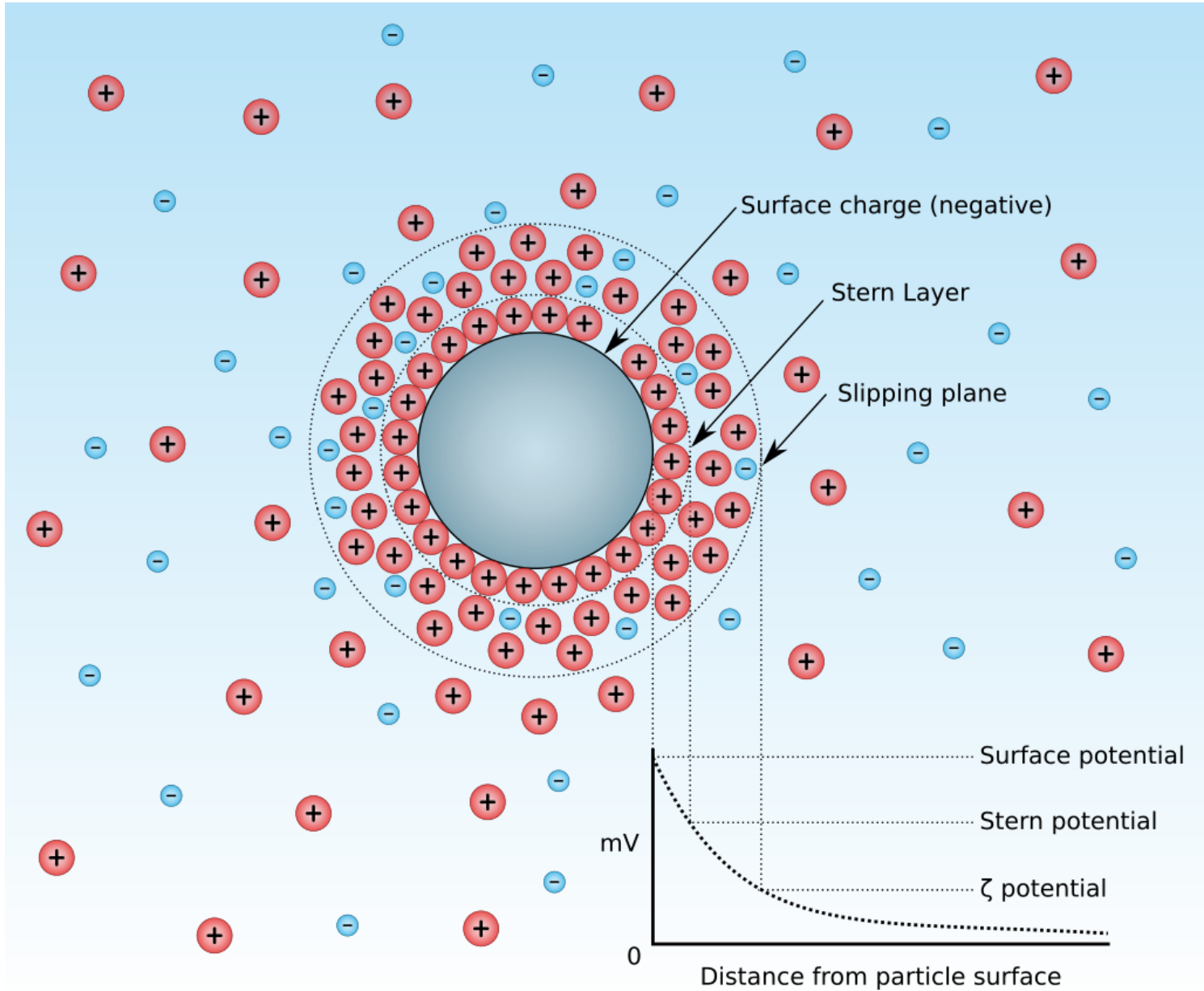
Supposing that the diameter given by DLS can be approximated to represent the diameter of a circular-shaped graphene flake



Z-POTENTIAL



POTENCIAL-Z

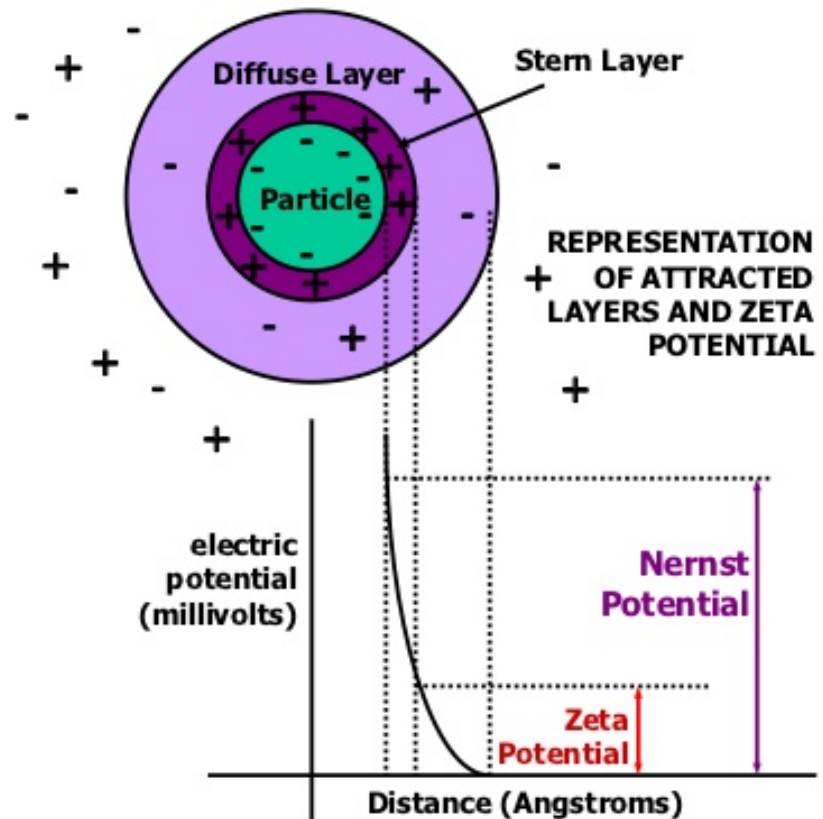


POTENCIAL-Z

HORIBA

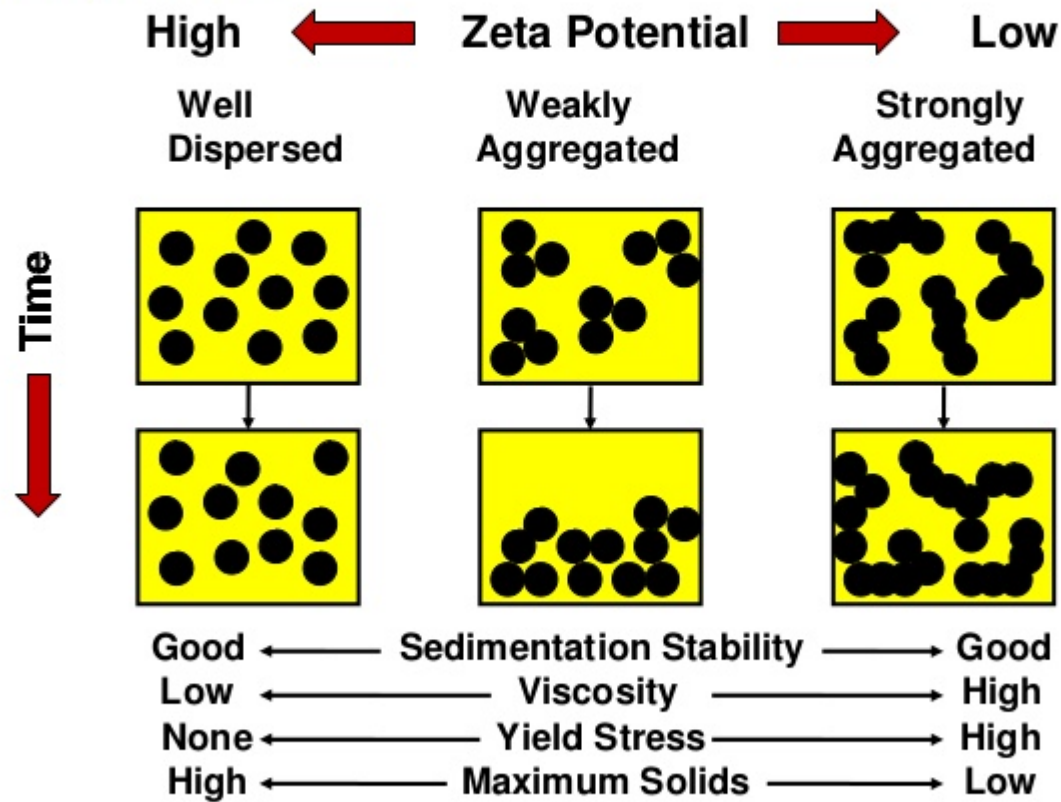
ZETA POTENTIAL

- If a particle is negatively charged, a thin layer of positive charge forms around the particle (the **Stern Layer**).
- Beyond the Stern Layer, is the **DIFFUSE Layer** where there is a wider layer of mostly opposite charge.
- The potential at the surface of the particle is designated the **NERNST Potential**, and the potential at the outside of the Stern layer is designated the ZETA Potential.
- **ZETA Potential** is a useful because it quantifies the surface activity of colloidal particles.

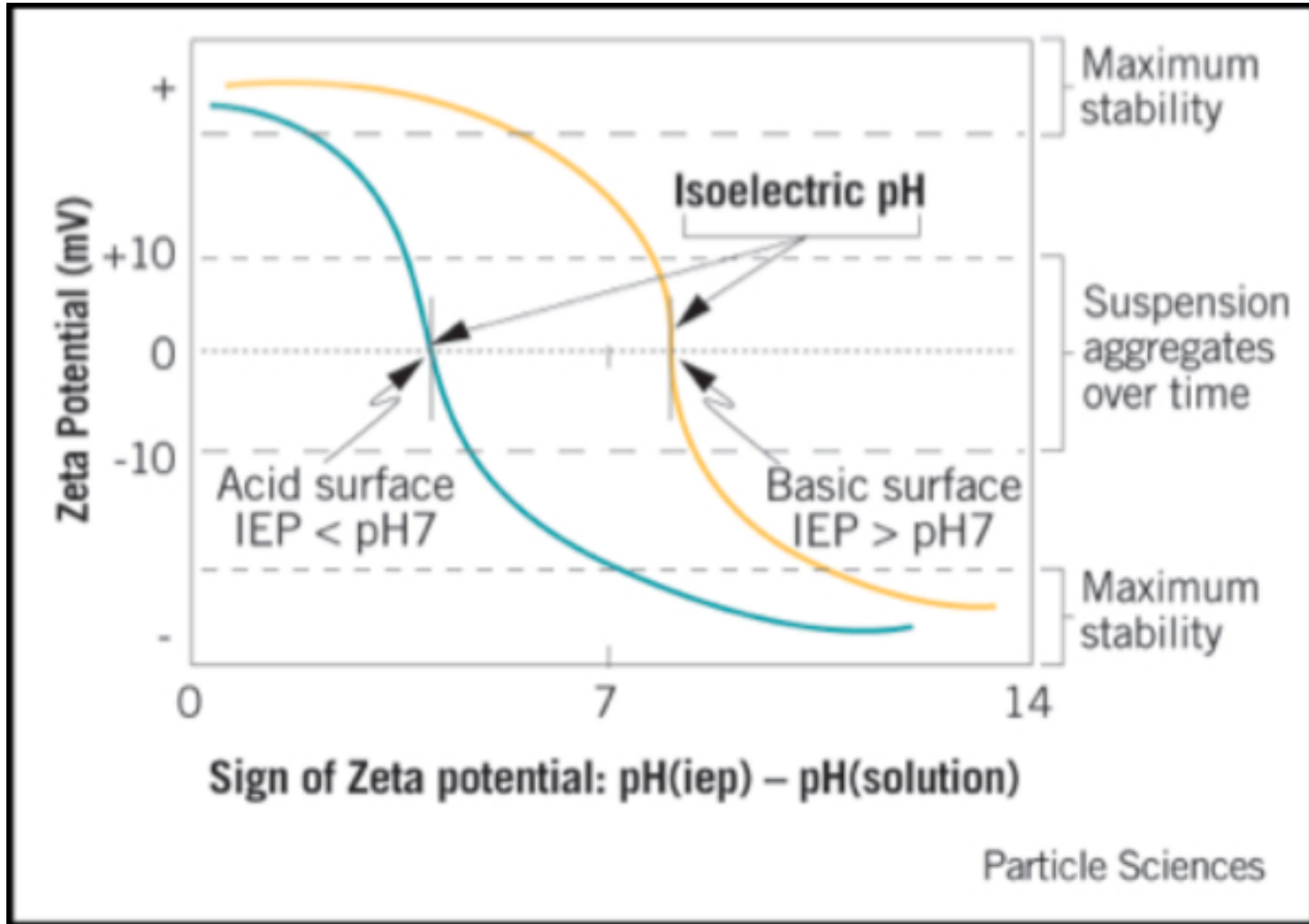


POTENCIAL-Z

Effect of Zeta Potential on Suspension Properties



POTENCIAL-Z



POTENCIAL-Z

Zeta potential [mV]

from 0 to ± 5 ,

from ± 10 to ± 30

from ± 30 to ± 40

from ± 40 to ± 60

more than ± 61

Stability behavior of the colloid

Rapid coagulation or flocculation

Incipient instability

Moderate stability

Good stability

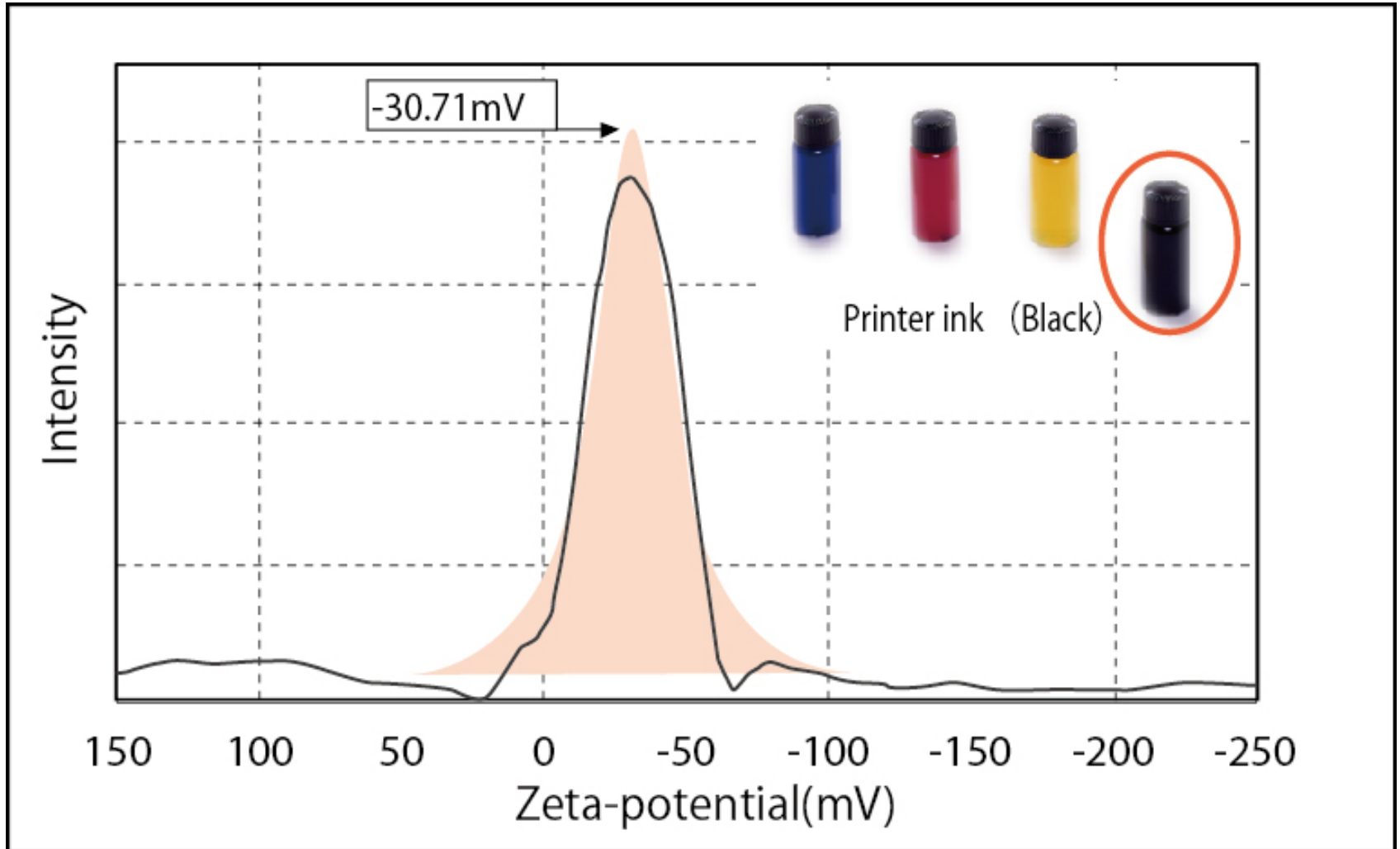
Excellent stability

APLICACIONES DE POTENCIAL-Z

Material	pH value of I.E.P.
Oxides	
Silicon Dioxide	2
Titanium Dioxide (Anatase)	4
Titanium Dioxide (Rutile)	6
Iron Oxide	8
Aluminum Oxide	9
Zinc Oxide	10
Magnesium Oxide	12
Proteins	
Ovalbumin	4.0
Casein	4.6
Gelatin	4.8
Streptavidin	5.0
BSA	5.0
Lactoglobulin	5.3
Rapeseed 12S	7.0
Ribonuclease	9.5
Avidin	10.5

Particle Sciences

APLICACIONES DE POTENCIAL-Z

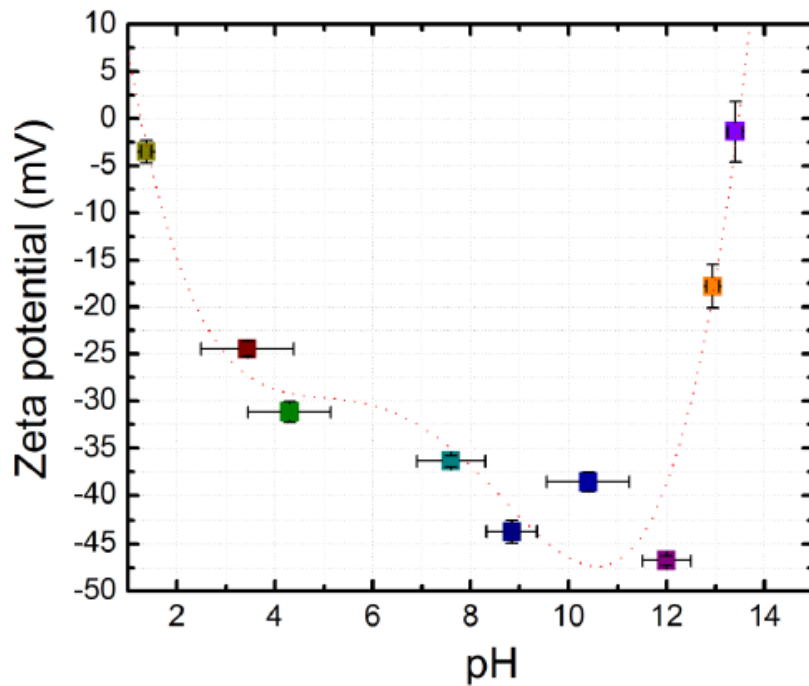


APLICACIONES DE POTENCIAL-Z

Graphene oxide from GANF

Zeta potential

Carried out in BIC 90Plus analyzer.



Elemental analysis

Performed in an analyzer LECO CHNS-932.
(Model NO: 601-800-500).

Carbon $45.22 \pm 0.12\%$
Hydrogen $3.10 \pm 0.04\%$
Nitrogen $0.35 \pm 0.01\%$
Oxygen $51.34 \pm 0.17\%$