

Dario Fontana,^{*1} Fabio Todesco,² Enrico Tognella,² Silvia Vicini,² Maria Elena Gennaro,² Alberto Pontarollo,² and Dario Pasini¹

¹ Department of Chemistry, University of Pavia, Via Taramelli 12, 27100 Pavia, Italy

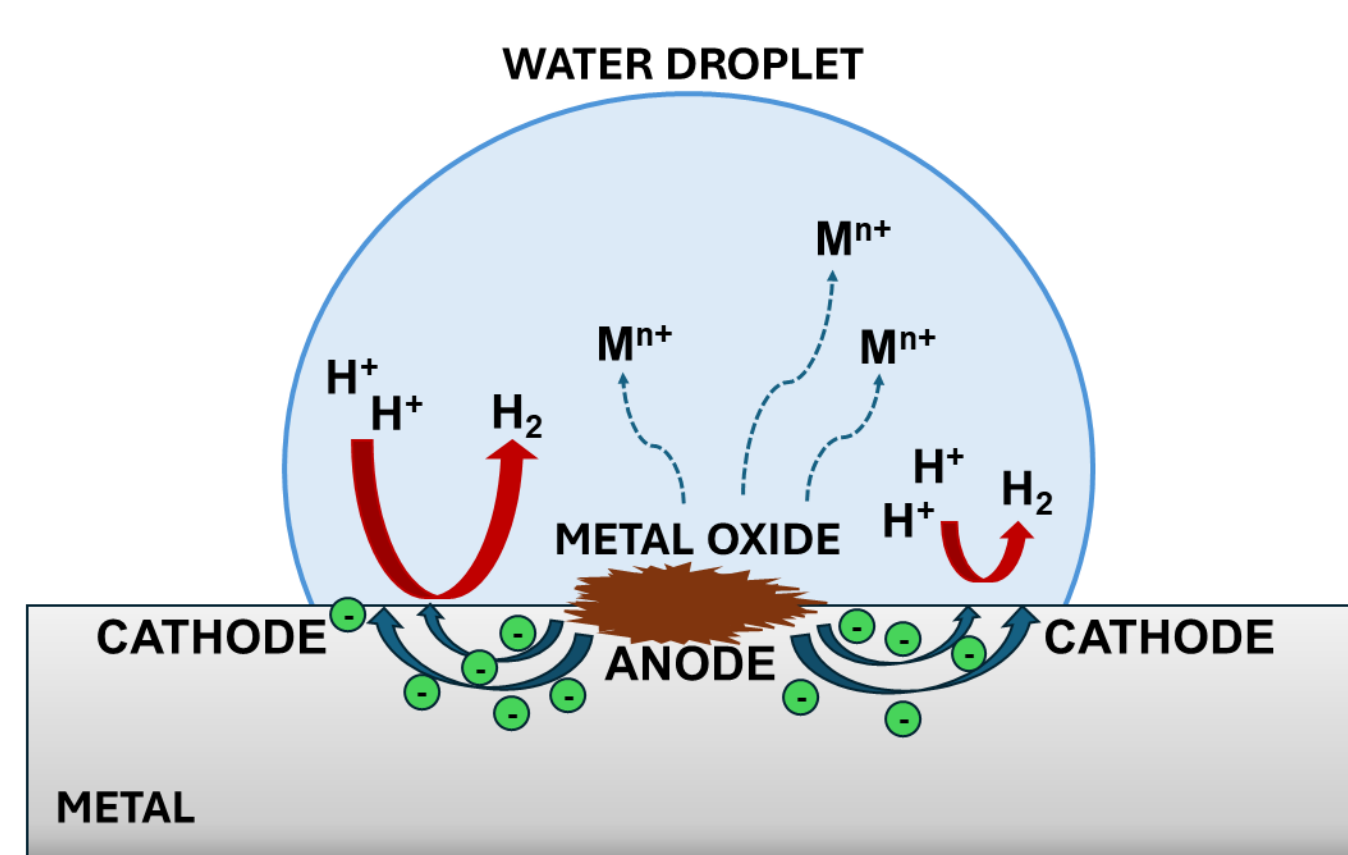
² VELAB/ANST Corrosion Prevention and Technological Services - Eni Spa, via delle industrie 39, 30175 Venezia Marghera VE, Italy

INTRODUCTION

Unlike traditional polymer materials, conductive polymers exhibit electrical conductivity similar to that of metal and semiconductors and tunable redox properties thanks to doping. Since their discovery in the 70's, conductive polymers have attracted a lot of attention due to their remarkable properties and applications such as electronics, energy storage, sensors, and even corrosion prevention.¹

Traditionally corrosion prevention is provided by adding inorganic corrosion inhibitors in the metal formulation or by covering the metal surface with a barrier coating like polyurethane or epoxy resin.

In this framework, conductive polymers can be innovative materials in the field of corrosion prevention because they can provide the typical adhesion and protection of polymers but also the semiconductors' redox properties capable of interfering with the electrochemical phenomenon of corrosion.²

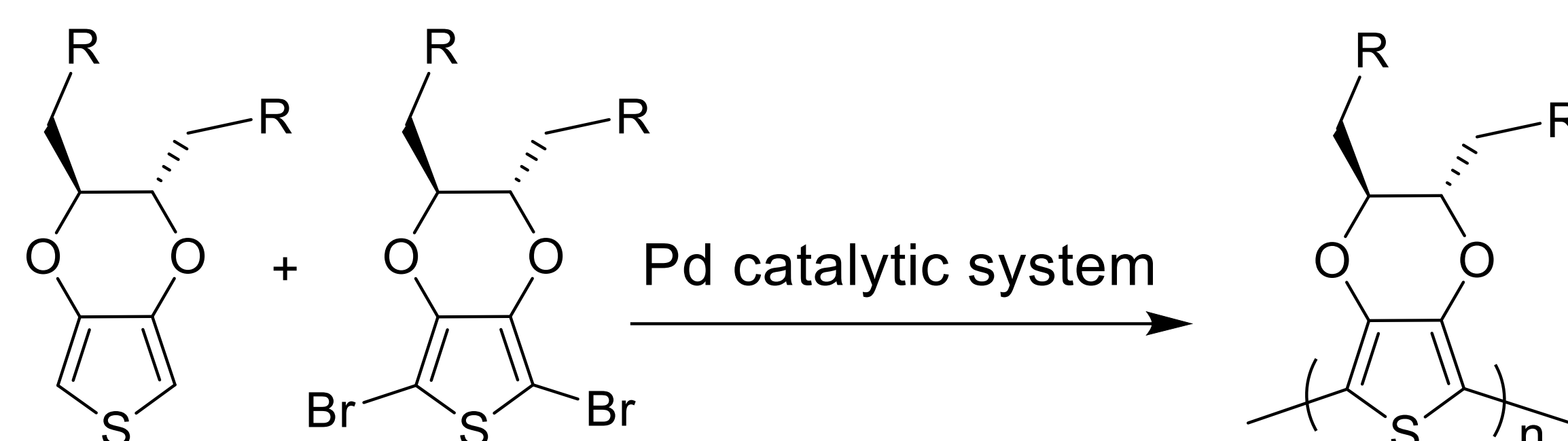


AIM OF THE PROJECT

This research aims to synthesize novel anticorrosive conductive coatings and to study in depth the effect organic functionalization and reaction conditions on the polymer properties. Particularly, PEDOT was synthesized by Pd catalyzed polymerization.^{3,4,5} Such synthesis is conceived with the goal of obtaining a hydrophobic conductive polymer to show both the barrier effect towards corrosive agents and inherent redox anticorrosive properties.

SYNTHESIS OF PEDOT

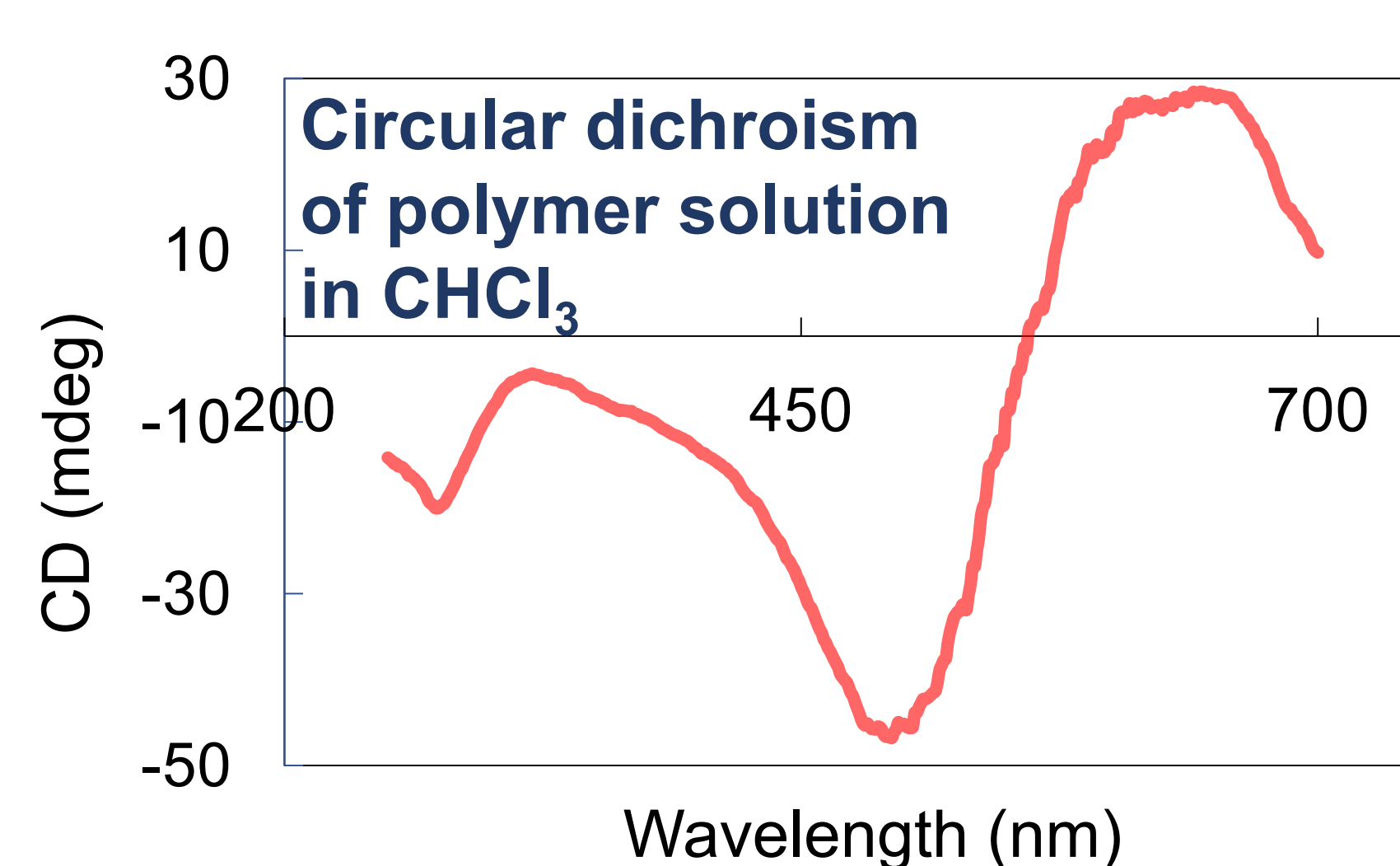
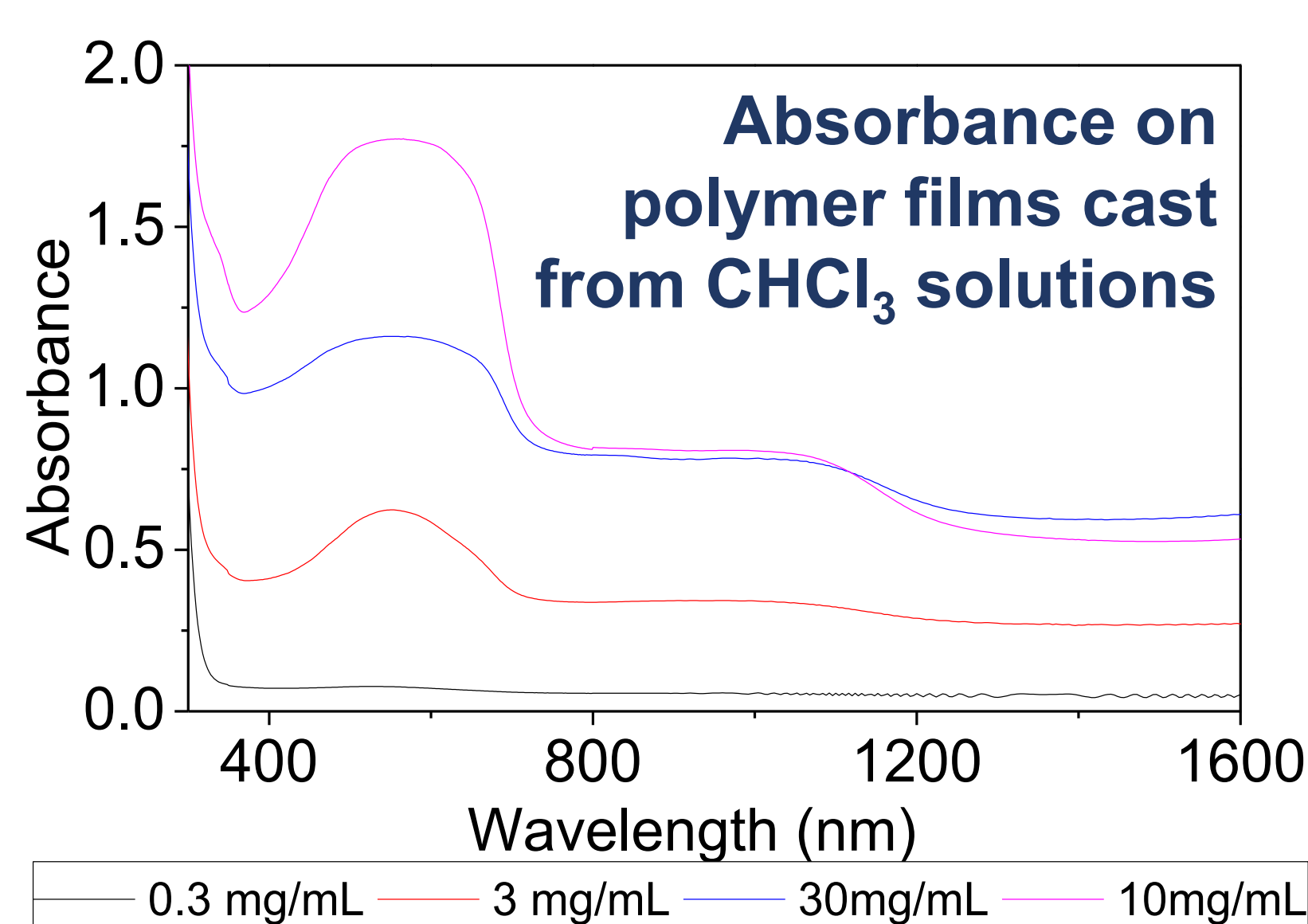
DIRECT ARYLATION POLYMERIZATION



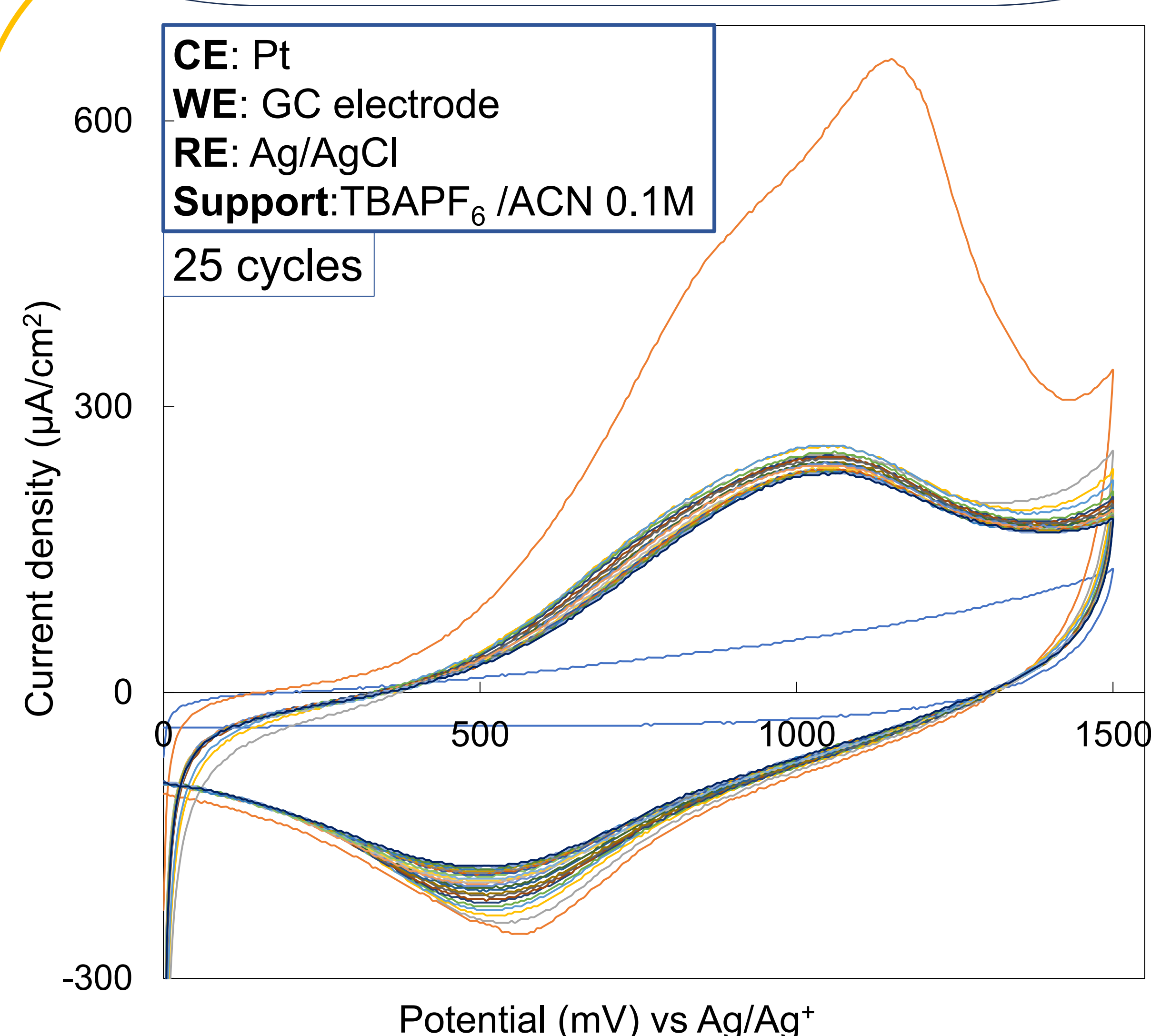
Chiral EDOT monomer

Solvent	Catalyst	Phosphine	Acid	Base	T	Yield (%)	M _n (Da)	Đ
DMAc	Pd(OAc) ₂	-	0.3 eq PivOH	K ₂ CO ₃	140°C	60	7000	1.27
Toluene	Hermann-Beller	P(o-anisyl) ₃	0.3 eq PivOH	Cs ₂ CO ₃	115°C	81	4900	1.23
p-Cymene	PdCl ₂ (PPh) ₃	P(o-anisyl) ₃	1 eq NDA	Cs ₂ CO ₃	115°C	32	4700	1.19
DMAc	Pd(OAc) ₂	-	0.3 eq PivOH	K ₂ CO ₃	100°C	2 fractions	3500; 5900	1.16;1.29
DMAc	Pd(OAc) ₂	-	1 eq PivOH	K ₂ CO ₃	140°C	21	4993	1.26

OPTICAL PROPERTIES

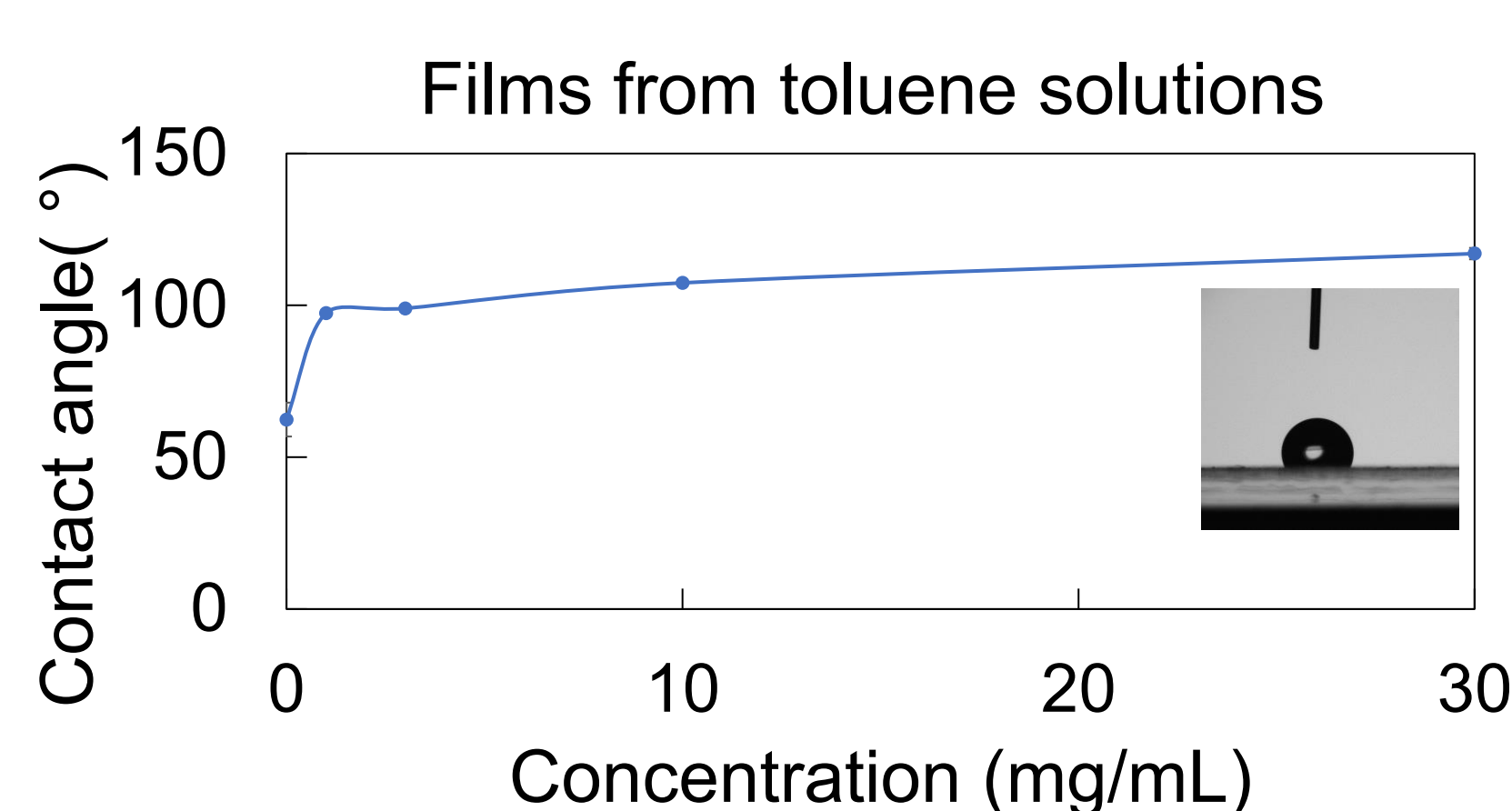
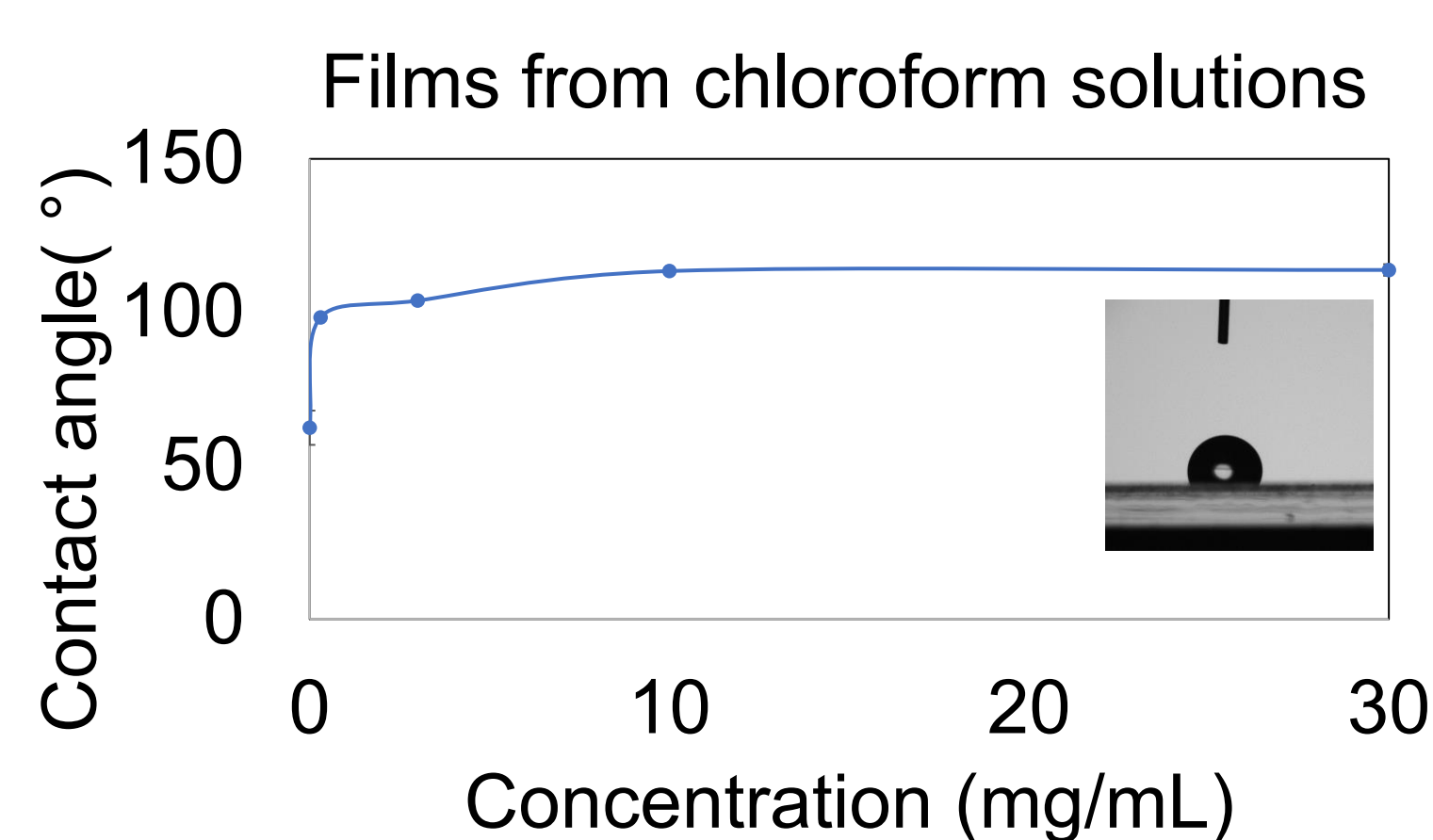


ELECTROCHEMICAL PROPERTIES



- Only positive potentials
- Difference from the first cycle
- Reversible process

HYDROPHOBICITY



REFERENCES

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