



Universiteit  
Leiden  
The Netherlands

## **Cathodic corrosion**

Hersbach, T.J.P.

### **Citation**

Hersbach, T. J. P. (2018, December 19). *Cathodic corrosion*. Retrieved from <https://hdl.handle.net/1887/68033>

Version: Not Applicable (or Unknown)

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/68033>

**Note:** To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/68033> holds various files of this Leiden University dissertation.

**Author:** Hersbach, T.J.P.

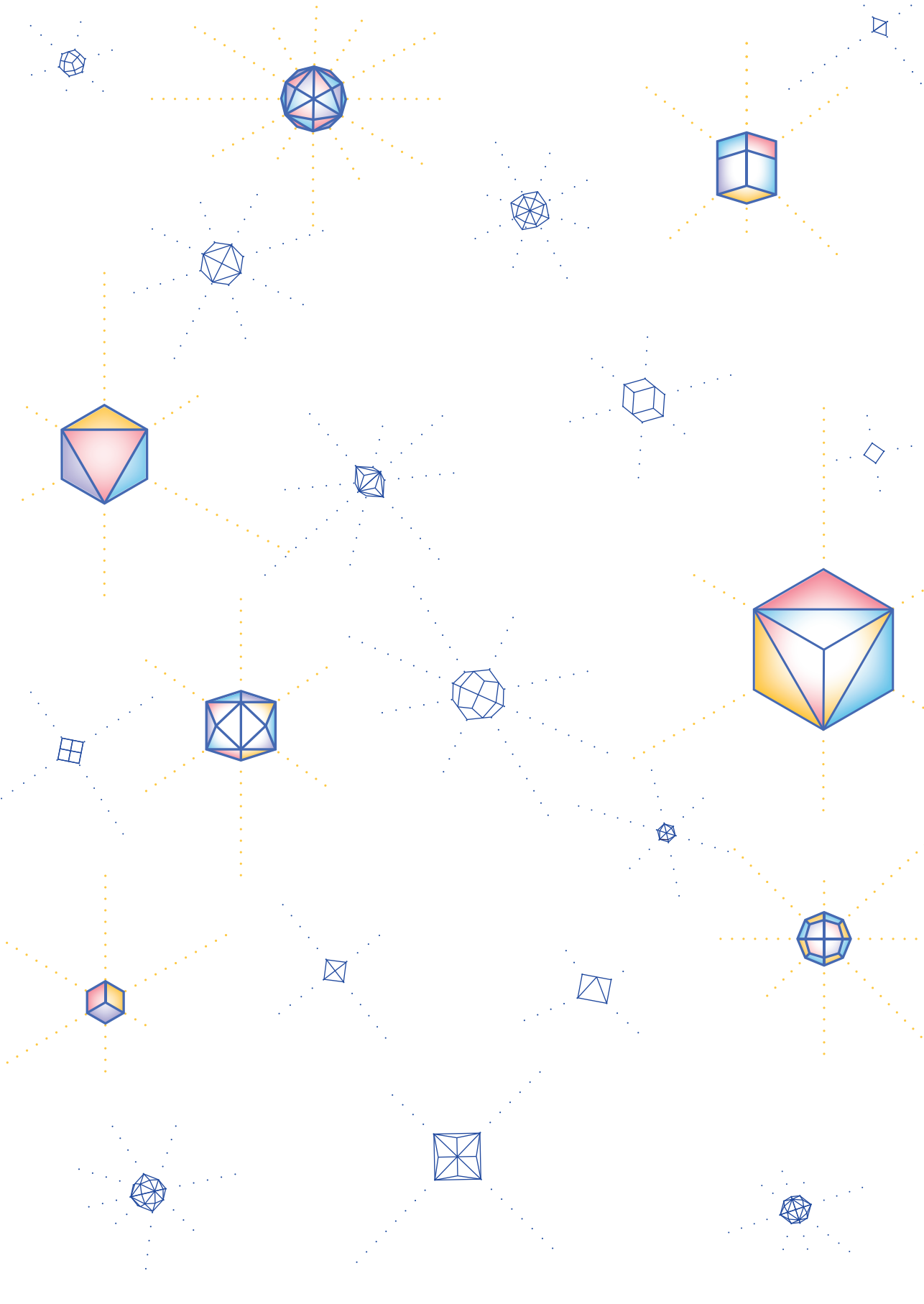
**Title:** Cathodic corrosion

**Issue Date:** 2018-12-19

# Cathodic Corrosion

Thomas Johannes Petrus Hersbach







# Cathodic Corrosion

---

*Proefschrift*

ter verkrijging van  
de graad van Doctor aan de Universiteit Leiden,  
op gezag van Rector Magnificus Prof. mr. C.J.J.M. Stolker,  
volgens besluit van het College voor Promoties,  
te verdedigen op 19 december, 2018  
klokke 12:30 uur

---

*door*

**Thomas Johannes Petrus Hersbach**

geboren te Purmerend in 1991

# PROMOTIECOMISSIE

## PROMOTOR / SUPERVISOR

Prof. Dr. Marc T. M. Koper (Universiteit Leiden)

## CO-PROMOTORS / CO-SUPERVISORS

Dr. Amanda C. Garcia (TNO)

Dr. Federico Calle-Vallejo (Universitat de Barcelona)

## OVERIGE LEDEN / OTHER MEMBERS

Prof. Dr. H. S. Overkleeft (Universiteit Leiden)

Prof. Dr. E. Bouwman (Universiteit Leiden)

Prof. Dr. R. M. Crooks (University of Texas at Austin)

Prof. Dr. P. E. de Jongh (Universiteit Utrecht)

Printed by Gildeprint

Book Design by Victoria Flores

ISBN: 978-94-6323-435-1

Si tu m'apprivoises, nous aurons besoin l'un de l'autre. Tu seras pour moi unique au monde. Je serai pour toi unique au monde.

~ Antoine de Saint-Exupéry,  
*Le Petit Prince*



# TABLE OF CONTENTS

<b>1</b>	Introduction .....	1	
<b>2</b>	Anisotropic Etching of Platinum Electrodes at the Onset of Cathodic Corrosion .....	11	
<b>3</b>	Anisotropic Etching of Rhodium and Gold as the Onset of Nanoparticle Formation by Cathodic Corrosion ....	27	
<b>4</b>	Alkali Metal Cation Effects in Structuring Pt, Rh and Au Surfaces through Cathodic Corrosion .....	49	
<b>5</b>	Operando HERFD-XANES Investigation of Pt during Cathodic Corrosion .....	87	
<b>6</b>	Enhancement of Oxygen Reduction Activity of Pt(111) through Mild Cathodic Corrosion .....	105	
<b>7</b>	Local Structure and Composition of PtRh Nanoparticles Produced through Cathodic Corrosion ....	119	
<b>8</b>	Summary and Future Outlook .....	139	

## Appendices

<b>A</b>	Supplementary Information for Chapter 4 .....	145
<b>B</b>	Supplementary Information for Chapter 5 .....	175
<b>C</b>	Supplementary Information for Chapter 6 .....	183
<b>D</b>	Supplementary Information for Chapter 7 .....	189

