

# ISO/TR 23173:2021 (E)

## Surface chemical analysis — Electron spectroscopies — Measurement of the thickness and composition of nanoparticle coatings

---

### Contents

	Foreword
	Introduction
1	Scope
2	Normative references
3	Terms and definitions
4	Symbols and abbreviated terms
5	Overview
6	X-ray photoelectron spectroscopy
6.1	General
6.2	Coating thickness measurement
6.3	Nanoparticle coating thickness
6.4	Numerical methods
6.5	Descriptive formulae
6.6	Modelling and simulation software
6.7	Method comparisons
6.8	Inelastic background analysis
6.9	Elemental composition
6.10	Variable excitation energy XPS
6.10.1	General
6.10.2	Qualitative depth-profiling
6.10.3	Quantitative depth-profiling
6.11	Near-ambient-pressure XPS (NAP-XPS)
6.11.1	General
6.11.2	Internal structure of bimetallic NP catalysts
6.11.3	Measurement of NP's in liquid suspension
7	Auger electron spectroscopy
7.1	General
7.2	Coating thickness measurement
7.2.1	General
7.2.2	Destructive depth-profiling
7.2.3	Non-destructive depth-profiling
7.2.4	Elemental composition
7.2.5	Imaging and line scans
8	Complementary analysis
9	Deviations from ideality
9.1	General
9.2	Multilayered coatings
9.3	Other non-ideal cases
Annex A	(informative) Example script for modelling of XPS data from nanoparticles