

Single NdPc₂ Molecules on Surfaces: Adsorption, Interaction, and Molecular Magnetism

Sarah Fahrendorf

Forschungszentrum Jülich GmbH
Peter Grünberg Institute (PGI)
Electronic Properties (PGI-6)

Single NdPc₂ Molecules on Surfaces: Adsorption, Interaction, and Molecular Magnetism

Sarah Fahrendorf

Schriften des Forschungszentrums Jülich
Reihe Schlüsseltechnologien / Key Technologies

Band / Volume 57

ISSN 1866-1807

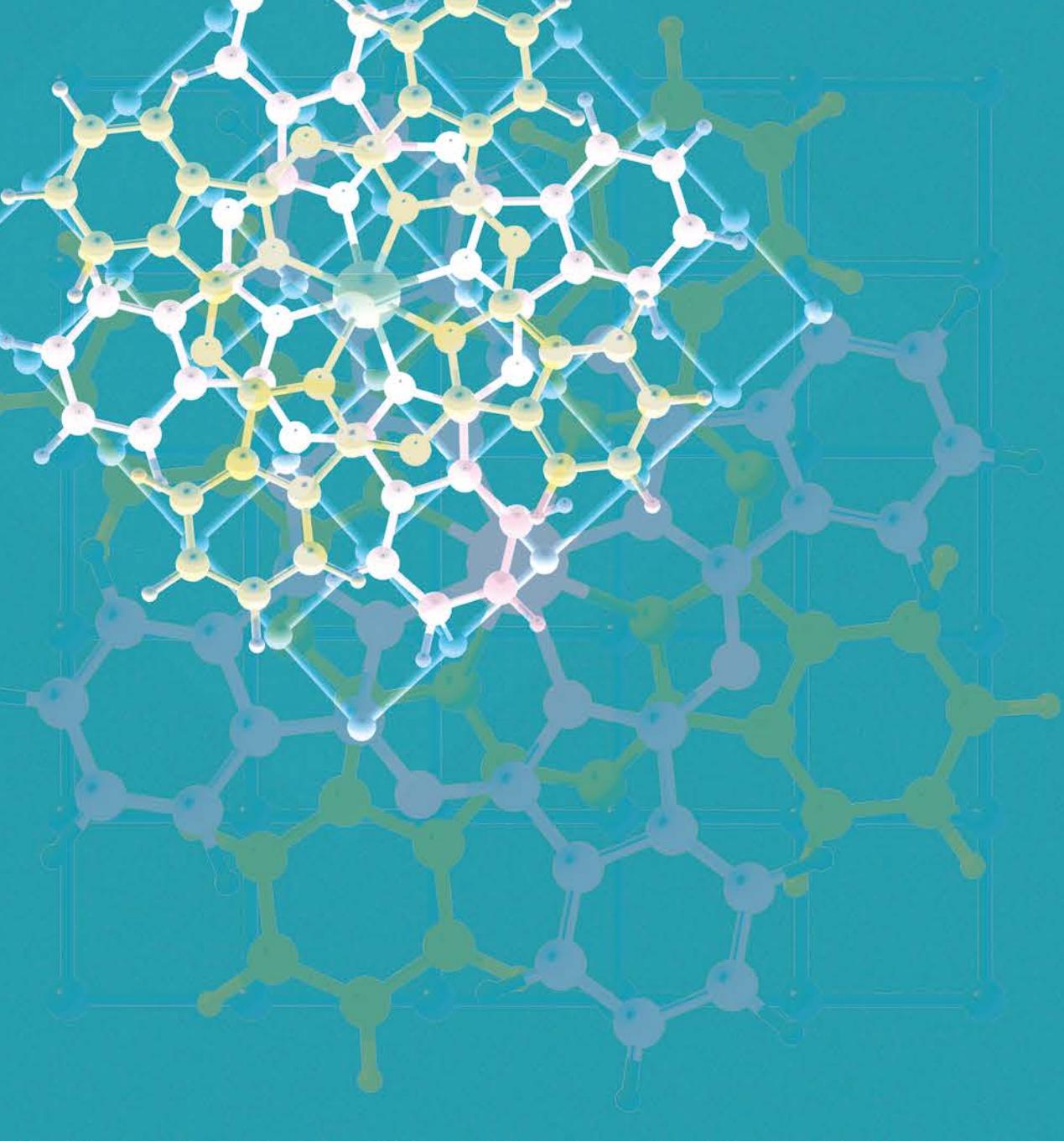
ISBN 978-3-89336-856-3

Contents

I	Introduction	1
II	Molecules in Spintronics	5
II.1	Molecules with Magnetic Properties	5
II.1.1	Single Molecule Magnets	6
II.2	Adsorption on Surfaces	7
II.3	Magnetic Molecules on Surfaces	9
II.4	NdPc ₂ Double-Decker Molecule	9
III	Scanning Tunneling Microscopy	13
III.1	The One Dimensional Tunneling Effect	14
III.2	Interpreting STM Images	16
III.3	Probing the Local Density of States	18
III.4	Spin-Polarized Tunneling Experiments	20
IV	Experimental Methods	25
IV.1	Vacuum System	25
IV.2	Tip Preparation	27
IV.2.1	Tungsten Tips	27
IV.2.2	Chromium Tips	28
IV.3	Sample Preparation	33
IV.3.1	Sputtered Samples	33
IV.3.2	HOPG	34
IV.3.3	Iron on Tungsten	35
IV.4	Molecules	36
V	Adsorption of NdPc₂ on Surfaces	39
V.1	Surface-Dependent Adsorption	40
V.1.1	Cu(100)	41
V.1.2	Fe on W(110)	43
V.1.3	Au(111)	44
V.1.4	Au(100)	46
V.1.5	HOPG	47
V.2	Discussion	47

Contents

VI NdPc₂ Spin-Polarized 4f-States Accessed by STM	51
VI.1 Adsorption of NdPc ₂ on Cu(100)	51
VI.2 Electronic Structure of the Adsorbed NdPc ₂	55
VI.3 Conclusion and Perspectives	61
VII Iron on Tungsten	63
VII.1 Previous Results	64
VII.1.1 Topography	64
VII.1.2 Electronic and Magnetic Properties	65
VII.2 SP-STM Investigations on the 2nd Monolayer of Fe on W	68
VII.2.1 Mapping the Surface	68
VII.2.2 Out-of-plane Domains	69
VII.2.3 Domain Wall Investigations	72
VIII NdPc₂ Adsorbed on Fe on W(110)	77
VIII.1 Topographic and Electronic Structure	78
IX Summary and Outlook	85
Bibliography	89
Acknowledgement	99



Schlüsseltechnologien / Key Technologies
Band / Volume 57
ISBN 978-3-89336-856-3

