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Light-to-Energy Conversion in Organic Solar Cells and Molecular Motors

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Light-to-Energy Conversion in Organic Solar Cells and Molecular Motors

**Nong Hoang
2022**

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on the authority of the
Rector Magnificus Prof. C. Wijmenga
and in accordance with
the decision by the College of Deans.

This thesis will be defended in public on

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Table of Contents

Chapter 1. General Introduction.....	1
1.1. Introduction.....	2
1.2. Light–Matter Interaction in Organic Materials	4
1.3. Charge Generation in Organic Semiconductors.....	10
1.4. Light-Driven Rotary Molecular Motors.....	13
1.5. Goals and Objectives	18
1.6. Methodology.....	18
1.7. Main Findings and Scope.....	19
1.8. Electronic Supporting Information	21
1.9. Personal Contribution	21
1.10. References.....	22
Chapter 2. Diffusion-Enhanced Exciton Dissociation in Single-Material Organic Solar Cells	31
2.1. Introduction.....	32
2.2. Results and Discussion	33
2.3. Conclusions.....	39
2.4. Samples and Methods	40
2.5. Author Contributions	42
2.6. References.....	42
Chapter 3. Photon Upconversion for Organic Solar Cells and Rotary Molecular Motors.....	45
3.1. Introduction.....	46
3.2. Photon Upconversion for Organic Solar Cells.....	49
3.3. Photon Upconversion for Rotary Molecular Motors.....	57
3.4. Conclusions.....	62
3.5. Samples and Methods	62
3.6. Supporting Information.....	66
3.7. Author Contributions	72
3.8. References.....	72

Chapter 4. Powering Rotary Molecular Motors with Low Intensity Near-Infrared Light	77
4.1. Introduction	78
4.2. Results and Discussion	79
4.3. Summary and Conclusions	87
4.4. Experimental Methods.....	87
4.5. Author Contributions.....	91
4.6. References	92
Chapter 5. Dual-Function Artificial Molecular Motors: Rotation and Photoluminescence	95
5.1. Introduction	96
5.2. Results and Discussion	98
5.3. Conclusions	106
5.4. Experimental Methods.....	107
5.5. Author Contributions.....	110
5.6. References	111
Chapter 6. Fluorescent Rotary Molecular Motor Functionalised with BODIPY	115
6.1. Introduction	116
6.2. Results and Discussion	118
6.3. Conclusions	127
6.4. Experimental Methods.....	127
6.5. Author Contributions.....	129
6.6. References	129
Summary	133
Samenvatting.....	137
Acknowledgements	141
Curriculum Vitae.....	144

List of Abbreviations

1PE	One-Photon Excitation
2PA	Two-Photon Absorption
2PE	Two-Photon Excitation
BBO	β -barium borate
BHJ	Bulk Heterojunction
BODIPY	Boron dipyrromethene
C ₆₀	Fullerene
CD	Circular Dichroism
CHCl ₃	Chloroform
CI	Conical Intersection
CT	Charge Transfer
CuI	Copper(I) Iodide
DFT	Density Functional Theory
DIP	Diindenoperylene
<i>E/Z</i>	<i>Entgegen/Zusammen</i>
EQE	External Quantum Efficiency
ESA	Excited-State Absorption
ESI	Electronic Supporting Information
FC	Franck–Condon
FWHM	Full Width at Half Maximum
GSB	Ground State Bleaching
HOMO	Highest Occupied Molecular Orbital
IQE	Internal Quantum Efficiency
ISC	Intersystem Crossing
ITO	Indium Tin Oxide
KMC	Kinetic Monte Carlo
L _D	(Exciton) Diffusion Length
LED	Light-Emitting Diode
LUMO	Lowest Unoccupied Molecular Orbital
MeCN	Acetonitrile
NFA	Non-Fullerene Acceptor
NIR	Near Infrared
NMR	Nuclear Magnetic Resonance

NTO	Natural Transitions Orbital
OD	Optical Density
OLED	Organic Light-Emitting Diode
OSC	Organic Solar Cell
PCE	Power Conversion Efficiency
PES	Potential Energy Surface
PIA	Photo-Induced Absorption
PL	Photoluminescence
PLQY	Photoluminescence Quantum Yield
PSS	Photostationary State
PtTPBP	Phosphorescent dye Pt(II)-tetraphenyl-tetrabenzoporphyrin
QY	Quantum Yield
RET	Resonance Energy Transfer
SD	Standard Deviation
SE	Stimulated Emission
SF-TDDFT	Spin-Flip Time-Dependent Density Functional Theory
TA	Transient Absorption
TD-DFT	Time-Dependent Density Functional Theory
TDM	Transition Dipole Moment
THF	Tetrahydrofuran
THI	Thermal Helix Inversion
Ti:sapphire	Titanium-doped sapphire (<i>laser gain medium</i>)
TTA	Triplet–Triplet Annihilation
TTA-UC	Triplet–Triplet Annihilation-based Upconversion
TTET	Triplet–Triplet Energy Transfer
UC	Upconversion
UCPL	Upconverted Photoluminescence
UV	Ultraviolet
UV/Vis	Ultraviolet/Visible
UV/Vis/NIR	Ultraviolet/Visible/Near Infrared
WLC	White-Light Continuum
α -6T	Alpha-sexithiophene
Δ OD	Difference Absorption