Preface

These notes on photovoltaic solar energy conversion result from lectures given to graduate students in the Physics Department of Carl von Ossietzky University Oldenburg over the last two decades, the aim being to increase the number of young people getting expertise in 'photovoltaics,' to motivate young colleagues and graduate and Ph.D. students in physics, chemistry, and eventually electrical engineering, as well as researchers involved in basics and applications of these disciplines, to reflect upon the conversion of solar light with fundamental concepts, to ask themselves questions, and to try to find consistent answers on how photovoltaic solar energy conversion works and contribute successfully to its progress. If senior scientists and colleagues interested in or already working in the field also find here some new aspects of the problem, this would be a further positive point.

The contents of these notes have been developed on the basis of contributions in the form of textbooks by two well-known experts, in particular A. deVos (*Endoreversible Thermodynamics for Solar Energy Conversion*) and P. Würfel (*Physics of Solar Cells*), and have been garnished by some of my own ideas on how to understand and visualize the microscopic physical mechanisms and effects.

These personal ideas have, of course, been influenced by contacts, feedback, and very fruitful discussions and collaborations with friends and colleagues over the last few decades, including in particular Peter Würfel and Tom Markvart, as well as Gion Calzaferri, Reinhard Carius, Jean-François Guillemol, Wolfram Jägermann, Jean-Paul Kleider, Uwe Rau, Harald Ries, Helmut Tributsch, and many others not explicitly listed here. I am grateful for the opportunity to meet and exchange ideas and concepts with numerous attendees of conferences, workshops, and meetings on general physics, on photovoltaics and solar energy conversion, and I must not forget the stimulus of questions and comments from my closer scientific environment during my stay at Carl von Ossietzky University in Oldenburg, including in particular Dr. Rudi Brüggemann and my Ph.D. and diploma students.

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Oldenburg, Germany and Soubès, France G.H. Bauer
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Bauer, G.H.

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