

## Materials from Renewable Resources

Most synthetic organic materials and polymers are currently produced from fossil carbon resources. We develop methods to transform natural biopolymers and bulk natural products into high performance materials.

## Teaching Sustainable Chemistry

We develop and evaluate concepts to teach Sustainable Chemistry at all levels ([www.oc-praktikum.de](http://www.oc-praktikum.de)). The CCC Graduate School of Sustainable Chemistry (CCGS) offers a structured PhD program in Sustainable Chemistry complementing the individual research work.

## Vision

- Conceptualize eco-friendly chemicals, solvents, surfactants, and liquid solutions for chemical and industrial processes
- Play a pivotal role in benign ways of producing chemicals and solvents
- Strengthen the cooperation between fundamental and industrial research partners
- Create a sustainable economy using green chemistry

## Contact

*Chairman*

### Prof. Dr. Werner Kunz

Institut für Physikalische Chemie  
Universität Regensburg  
93040 Regensburg  
Office: CH 12.2.83  
Tel.: +49 941 943-4296, -4045  
Fax: +49 941 943-4532  
werner.kunz@chemie.uni-regensburg.de

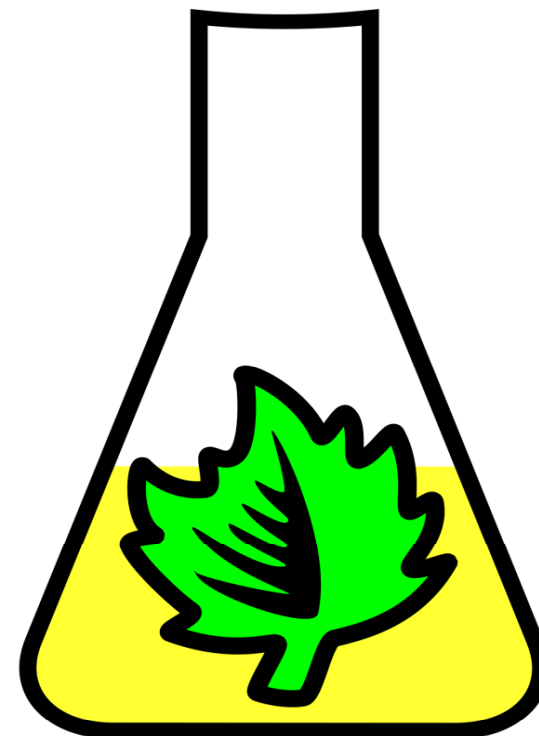
*Research Coordinator*

### Dr. Murali Sukumaran

Fakultät für Chemie & Pharmazie  
Universität Regensburg  
93053 Regensburg  
Office: CH 03.1.87  
Tel.: +49 941 943-1965  
Fax: +49 941 943-81-1965  
murali.sukumaran@chemie.uni-regensburg.de

## Impressum

Herausgeber: Universität Regensburg, Fakultät für Chemie & Pharmazie, Institut für Organische Chemie  
Fotos: Universität Regensburg; Prof. Dr. Werner Kunz, Institut für Physikalische Chemie; Dr. Sabine Amslinger, Institut für Organische Chemie; Wissenschaftszentrum Straubing  
Gestaltung: Dr. Murali Sukumaran, Fakultät für Chemie & Pharmazie, Universität Regensburg  
Redaktion: Prof. Dr. Werner Kunz, Institut für Physikalische Chemie; Prof. Dr. Burkhard König, Institut für Organische Chemie, Universität Regensburg



**Carl von Carlowitz  
Center for  
Sustainable  
Chemistry**



Universität Regensburg

## Profile



The Carl von Carlowitz Center (CCC) at the department of chemistry and pharmacy, University of Regensburg investigates the chemical use of non-fossil renewable resources. The CCC is a cooperative initiative of the faculties of chemistry and pharmacy, physics, biology, didactics and the Straubing Center of Science (Wissenschaftszentrum Straubing) as external partner. With strong collaborative interdisciplinary research activities, the CCC strives to address issues from fundamental research to industrial applications. We aim to develop methods and processes that allow the synthesis of fine chemicals from abundant non-edible natural products. The production of fuels or energy generation is not within the scope of the CCC.

As fossil carbon resources are depleting, large efforts are now made to substitute these by renewable energy, such as wind and solar power. Current chemical production uses only about 3% of all annually consumed fossil carbon, but it is the same oil or coal and cannot be

reserved for chemistry. Alternative starting materials for chemical synthesis are non-eatable, renewable and well abundant carbon sources, such as cellulose or lignin. However, the current chemical methodology was developed for hydrocarbons and is therefore not well suited to convert them efficiently into fine chemicals or chemical products.

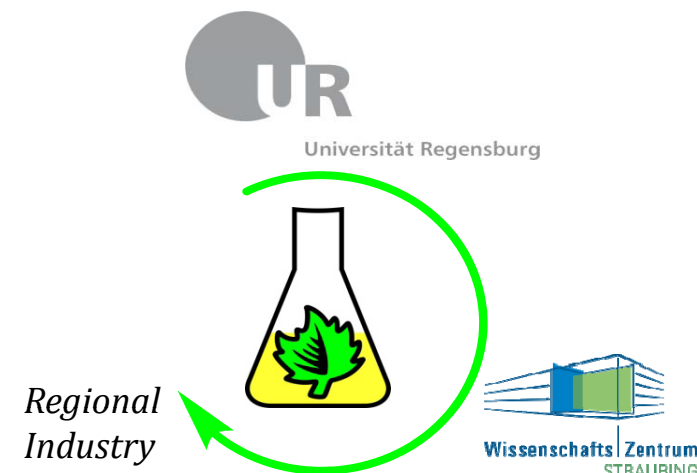
The Carl von Carlowitz center aims to develop the methods and processes for a future chemical synthesis and production based on renewable carbon resources. The key technology to achieve these goals is catalysis, including metal-, organo-, bio- and photocatalysis, but new reaction media and techniques are equally important. The toxicological evaluation of new compounds, efficiency analyses and the development of professional teaching concepts to implement sustainability issues in science curriculum complete the activities of the center.

## Goals

- To support the research members of the CCC network by facilitating research funding and research infrastructure
- To serve as a bridge between fundamental and applied research in sustainable chemistry
- To promote and disseminate knowledge in sustainable chemistry, especially in training master students and doctoral researchers at Graduate School as well as conducting research seminars and symposia
- To interconnect research topics in chemical ecology and sustainable chemistry

<http://www.chemie.uni-regensburg.de/fakultaet/forschung/CCC/index.phtml>

## Structure of the CCC



## Key research areas and activities

### Visible Light Photocatalysis

The conversion of sunlight into electrical energy by photovoltaic is already highly developed, the use of visible light for chemical synthesis is still rare. We develop heterogeneous and homogeneous photocatalysts for applications in synthesis.

### Catalytic Defunctionalization

Many natural products are highly functionalized, while chemicals for use in materials or consumer products typically bear less functional groups. To allow a facile transformation of bulk natural products into less functionalized intermediates we investigate catalytic methods of de- and refunctionalization.

### New reaction media and detergents

Melts and emulsions are essential in product formulation and technical processes. With solvents, detergents and ionic liquids based on natural products sustainable and non-toxic solutions are developed.