



# GAMA – Cellulose Acetate Monograph

## Preface

Acetone soluble cellulose diacetate has its 100<sup>th</sup> anniversary in 2004. During this time it found growing acceptance in various application fields like in coatings, moulded plastic materials, films, fibers, membranes and as composite in formulations and others. In some applications it was partially substituted by other materials, but due to its unique characteristics the industrial capacity of CA developed constantly to more than 800 000 tons/year today.

Scientific interest in Cellulose acetate was high, and important concepts and methods of the macromolecular chemistry have been founded on this material (see chapter 4.1.2).

In light of its scientific and commercial importance it is astonishing that there is no comprehensive book on the cellulose acetate properties and applications in existence.

In order to fill this gap a cellulose acetate monograph project was proposed to GAMA, the global Association of Acetate Manufacturers (more information about GAMA see next page).

GAMA created this Monograph project, in which we wanted to combine the academic expertise on the physical and chemical properties of the cellulose acetates with their industrial knowledge in technology and product properties.

Most of the GAMA members nominated authors and looked within their area for academic contributors to the project. Thus the first project meeting was held in Brussels in June 2002 in order to define the table of contents and the corresponding authors. One year later a cellulose acetate conference was organized in Heidelberg where the authors of the book and some specialists from our profession went chapter wise through the first draft of the book. Lots of crosslinks, corrections and sup positive ideas were made for the other members of the team.

We hope that many chemists around the world will be attracted by the information about the characteristics of cellulose acetate and will be inspired to try it for new applications or to find out some of its still unrevealed properties. As CA is made from natural replenishing cellulose its future importance in a more sustainable economy should grow.

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Mr. Masahiko Murayama suddenly passed away on January 1<sup>st</sup>, 2004 and this article is his posthumous manuscript. We, the authors of this book, would like to express our sincere condolences.

Many thanks also to Elisabeth Rahm-Mahler, Angelika Sieg and Alba Bianchini for their support in the organization and in the overworking of the manuscripts. Due to the kind offer of Wiley's we are able to publish our cellulose acetate monograph as an issue of Macromolecular Symposia.

Paul Rustemeyer

GAMA project manager and editor



Participants of the Heidelberg CA-conference (left to right): Hiroki Karakane, Bev Braddock, Paolo Carollo, Mario Gambera, Thomas Heinze, Jürgen Puls, Armin Stein, Hans Steinmeier, Wolfgang Glasser, Peter Zugenmaier, Paul Rustemeyer, Jack Hensley, Shiro Saka, Bruno Alves, Tohru Shibata

## **GAMA**

### **Global Acetate Manufacturing Association**

was founded in the year 2000 in order to care for joint interests in the areas of

- consumption statistics
- application studies to promote the usage of CA
- release of technical information
- care of health, security and environmental concerns
- harmonization of analytical methods

Today 10 companies representing about 98% of the CA flake capacity and 80% of the total global CA processing capacity, are members of GAMA (see table 1).

Table 1: Current GAMA members:

<b>Company</b>	<b>Head- quarters</b>	<b>CA since</b>	<b>Flake</b>	<b>Textile</b>	<b>Filter Tow</b>	<b>Others</b>
ACETATI	Italy	1929	x			
ACORDIS Acetate Chemicals Ltd.	UK	1914	x	x	x	x
CELANESE Acetate LLC	USA	1924	x	x	x	
DAICEL Chemical Industries Ltd.	Japan	1950	x	x	x	x
VORIDIAN Chemical Company	USA	1924	x	x	x	x
INACSA	Spain	1948		x		
MITSHUBISHI Rayon Co. Ltd.	Japan	1962		x	x	
NOVCETA SpA	Italy	1954		x		
RHODIA Acetow GmbH	Germany	1912	x	(x)	x	(x)
SK Chemicals	South Korea	1958		x	x	

### Nomenclature of Cellulose Acetates

cellulose acetate	CA	DS 0,1 – 3
cellulose monoacetate	CMA	DS 0,6 – 1,4
cellulose diacetate	CDA	DS 2,2 – 2,7
cellulose triacetate	CTA	DS 2,8 – 3,0

The areas of degree of substitution have been chosen according to the solubility in chloroform, acetone and water.

The expression cellulose 2,5acetate (sometimes used in the literature) is synonym with cellulose diacetate and “secondary cellulose acetate”. We recommend writing “CA, DS 2,6” to describe a special cellulose acetate sample with a DS of 2,6.