
RADIATION-CURED PRODUCTS

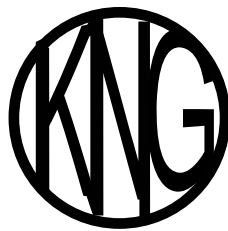
2005-2010

Includes Global Market Analysis

A Multiclient Study

NOW AVAILABLE

July, 2006



KUSUMGAR, NERLFI & GROWNEY

**One DeBaun Avenue C
West Caldwell, NJ 07006**

Phone: 973-439-0030

Fax: 973-439-0031

E-mail: nerlfikng@cs.com

APPLICATION, PERFORMANCE, & ENVIRONMENTAL ADVANTAGES

Radiation-curing has established itself in several larger volume end uses in the coating, ink and adhesive industries. Numerous small volume specialized applications have been commercialized and several potentially large outlets, such as automotive refinish, are under development. From an emerging technology just 2-3 decades ago, radiation-cured products achieved global sales of 270,000 metric tons in 2005 valued at \$2.75 billion. Growth has slowed in recent years, but a still modest 6% annual rate of increase is forecast through 2010.

As highlighted in Table 1, North America is the largest outlet in dollars with 35% of the value and is third in tonnage with a 27% share. Paper overprint coatings are the largest outlet for radcure products in North America taking nearly one third of the region's volume in 2005. Europe is the worldwide leader in volume with 37% of the tons, but is in third place in value with 30% of the dollars. Over one-half of European tonnage is lower average priced wood coatings, an end use where Europe consumes over one-half of the radcure total. Asia is the second largest consuming region in tonnage behind Europe and is also the runner-up in dollars behind North America. Wood coatings are the leading radcure market in Asia taking nearly one-third of the tons; paper overprints were an additional one-fifth of the volume in Asia. Europe and North America are maturing regions for radiation-cured products. In contrast, a robust 9% annual rate of growth is forecast for Asia which will make it the leading consumer in both volume and value by 2010.

The coatings industry took just over three-quarters of the radiation-cured product tonnage in 2005 and nearly 55% of the dollars. Wood and paper overprint coatings combined were 80% of the coating weight and two-thirds of the dollars. Optical fiber is a higher priced end use that saw a volume decline at the start of the decade; growth has now resumed at a modest rate. PVC flooring is a mature coating end use holding over a 5% share of the dollars. Other plastic applications were some 15% of the coating value and include automotive applications, optical discs, and hardcoats for flat panel displays and other uses.

Inks were an outlet for nearly 20% of the radcure product tons and 37% of the dollars. Offset and screen inks combined were over 90% of the ink volume. Radiation-cured inkjet inks were a miniscule portion of the weight, but 3% of the dollars. Inkjet inks are forecast to surge in usage. Adhesives were 5% of the global volume and 9% of the dollars, excluding extremely high priced dental adhesives. DVD lamination was nearly 40% of the adhesive volume and dollars. CDs and DVDs are leading users of radiation-cured products with over \$300 MM of coatings, inks and adhesives used in producing these discs in 2005. Numerous small volume assembly adhesive applications took 8% of the adhesives weight but over one-third of the dollars.

The leading materials consumed producing radcure products are oligomers, monomers and photoinitiators. The bulk of the oligomer and monomer are acrylated materials. In 2005 an estimated 110,000 tons of oligomer and 120,000 tons of monomer were consumed globally. Primary photoinitiator consumption was an additional 15,000

tons.

Table 1
RADIATION-CURED PRODUCT CONSUMPTION BY REGION

Region	2005		2010		%AGR
	Metric Ton	\$MM	Metric Ton	\$MM	
North America	72,000	950	90,000	1,180	5
Europe	100,000	820	115,000	980	3
Asia	87,000	900	135,000	1,260	9
South America	11,000	80	15,000	110	6
TOTAL	270,000	2,750	355,000	3,530	6

THE STUDY

RADIATION-CURED PRODUCTS, 2005-2010 characterizes U.S. consumption of radiation-cured coatings, inks and adhesives in 2005 and estimates usage in the year 2010. In addition, the global consumption of radiation-cured products is analyzed in a separate section of the report. A thorough business analysis is provided which includes profiles of the leading suppliers of radiation-cured products and their major raw material suppliers.

Subscribers will find **RADIATION-CURED PRODUCTS, 2005-2010** the definitive reference work. Current participants, and those contemplating entry, will find the study essential in their planning process. The study will be particularly attractive to firms introducing new materials and technologies to the global marketplace.

RADIATION-CURED PRODUCTS, 2005-2010 is based on over 400 interviews with formulators, raw material suppliers, equipment manufacturers, trade associations, and governmental agencies. Additionally, current literature, company web sites, government reports, etc. were reviewed and analyzed. Kusumgar, Nerlfi & Growney's extensive knowledge of the industries covered, gained over the past three decades, insures an accurate and comprehensive report

TABLE OF CONTENTS

FOREWORD	i
TABLE OF CONTENTS	iii
SCOPE AND EXPLANATIONS IN HOW TO USE THIS REPORT	vii
ABBREVIATIONS	ix
EXECUTIVE SUMMARY	1
Overview.....	1
Historical Consumption	3
Industry Review	4
Curing Technologies.....	5
Raw Materials	7
Supplier Structure, Raw Materials	8
Significant Trends.....	13
BUSINESS ANALYSIS	17
Overview.....	17
Technology	20
Raw Material, Supplier Profiles.....	24
Formulated Producer Supplier Profiles.....	32
Captive and Merchant Formulators.....	33
Significant Trends.....	45
Mergers and Acquisitions	47
GLOBAL OVERVIEW	51
APPLICATIONS AND MARKET SEGMENTATION	105
<u>Coatings</u>	105
Summary.....	105
Conformal.....	119
Glass	133
Metal.....	139
Optical Fibers	149
Paper and Paperboard	157
Plastic.....	183
Release.....	235
Vinyl Floor Products	253
Wood	259

TABLE OF CONTENTS (Continued)

<u>Inks</u>	293
Summary.....	293
Electronic and Optical Fiber.....	307
Flexographic.....	321
Inkjet.....	337
Letterpress.....	351
Offset.....	359
Screen.....	387
<u>Adhesives</u>	411
Summary.....	411
Assembly.....	425
Dental.....	449
Laminating.....	457
Pressure Sensitive.....	473
RAW MATERIALS	491
<u>Oligomer and Monomer</u>	491
Summary.....	491
Acrylated Acrylic.....	497
Amine Acrylate Coinitiators.....	501
Epoxy-Acrylate.....	505
Polyester-Acrylate.....	515
Silicone-Acrylate.....	523
Urethane-Acrylate.....	527
Cationic Epoxy.....	535
Other Oligomers/Polymers.....	543
<u>Monomers</u>	549
Monofunctional Acrylates.....	549
Multifunctional Acrylates.....	559
Vinyl Ether.....	577
Other Monofunctional.....	581
<u>Photoinitiators</u>	585
Summary.....	585
Free-Radical.....	587
Cationic.....	613
RESPONDENTS & INDEX	619

OUR QUALIFICATIONS

Kusumgar, Nerlfi & Growney is a consulting firm specializing in market research and business analysis for the polymer and chemical industries. Members of the firm possess some 70 years of experience analyzing the coating, ink, and adhesive industries. Kusumgar, Nerlfi & Growney is dedicated to providing comprehensive and accurate information and insight on technology driven markets.

The information and analysis contained in **RADIATION-CURED PRODUCTS, 2005-2010** was developed by Michael Growney, Steven Nerlfi and Minesh Kusumgar. No outside contractors were employed. Our expertise has been gained from conducting over 35 multiclient, and numerous proprietary, studies.

ADDITIONAL SERVICES

Kusumgar, Nerlfi & Growney's current project is **THE U.S. PAINT & COATINGS INDUSTRY, 2006-1011**. Completion of the study is expected in mid-2007. Interested parties should contact Kusumgar, Nerlfi & Growney for the prospectus and further information. Additionally, Kusumgar, Nerlfi & Growney recently completed **THE ASIAN COATINGS INDUSTRY** which details coating consumption in eleven countries in the region. Kusumgar, Nerlfi & Growney also welcomes inquiries for projects of a proprietary nature.

SUBSCRIPTION INFORMATION

RADIATION-CURED PRODUCTS, 2005-2010 is available through subscription. The price of the study is \$11,500 and includes eight copies of the report. Additional copies are available upon request. To subscribe, please complete the contract on the following page and return to Kusumgar, Nerlfi & Growney. For additional information please contact Kusumgar, Nerlfi & Growney at 973/439-0030 or nerlfikng@cs.com.

CONTRACT FOR RADIATION-CURED PRODUCTS, 2005-2010

KUSUMGAR, NERLFI & GROWNEY

**One DeBaun Avenue C
West Caldwell, NJ 07006**

Please initiate our participation in **RADIATION-CURED PRODUCTS, 2005-1010**. We understand our subscription entitles us to eight copies of the final report.

We agree that for a period of three years from publication to:

1. Not reproduce the study, in whole or in part, by any means.
2. Restrict use of the study to our own employees.
3. Prevent the disclosure of its contents, to the best of our ability, to any other firm or person.

We understand that we may disclose the contents of this study to any firm that we own more than half of, or to a company that maintains more than a half interest in our firm. We may use or disclose any information in the study which is public knowledge, in our possession before receiving the report, or that has been obtained from third parties, but not from this study.

Kusumgar, Nerlfi & Growney will take reasonable precautions to prevent disclosure of the contents of this study, except to subscribers, for a period of three years after it is issued.

We understand the fee for **RADIATION-CURED PRODUCTS, 2005-2010** is \$11,500 (U.S. dollars).

Kusumgar, Nerlfi & Growney will invoice us for the full amount upon acceptance of our participation, after a countersigned copy of this contract is returned to us for our records. We will pay this invoice within thirty days.

Accepted: Kusumgar, Nerlfi & Growney

Subscriber

Signature

Signature

Name

Name

Title

Title

Date

Date

POLYMER AND CHEMICAL BUSINESS ANALYSIS AND MARKET RESEARCH

ADDITIONAL SERVICES

RADIATION-CURED PRODUCTS, 2005-2010 is Kusumgar, Nerlfi & Growney's eleventh multiclient study. Studies immediately available, or scheduled for completion, include:

- **HOT MELT ADHESIVES**, May 1988
- **WATER-BASED PRODUCTS**, July 2000
- **RADIATION CURED PRODUCTS**, July 2001
- **THE U. S. PAINT AND COATINGS INDUSTRY**, December 2002
- **ADHESIVES IN DEVELOPING REGIONS**, December 2003
- **ADDITIVES, 2003-2008**, September 2004
- **THE ASIAN COATINGS INDUSTRY**, September 2005
- **THE U.S PAINT & COATINGS INDUSTRY, 2006-2011**, due mid 2007

Interested parties should contact Kusumgar, Nerlfi & Growney for subscription information. We also welcome inquires for projects of a proprietary nature.



KUSUMGAR, NERLFI & GROWNEY
One DeBaun Avenue C
West Caldwell, NJ 07006

Phone: 973-439-0030
Fax: 973-439-0031
E-mail: nerfikng@cs.com