

INORGANIC PIGMENTS

Manufacturing Processes

Chemical Technology Review No. 166

Edited by M.H. Gutcho

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NOYES DATA CORPORATION

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FOREWORD

The detailed, descriptive information in this book is based on U.S. patents issued since January 1975 that deal with the manufacture of inorganic pigments.

This book is a data-based publication, providing information retrieved and made available from the U.S. patent literature. It thus serves a double purpose in that it supplies detailed technical information and can be used as a guide to the patent literature in this field. By indicating all the information that is significant, and eliminating legal jargon and juristic phraseology, this book presents an advanced commercially oriented review of inorganic pigments manufacture.

The U.S. patent literature is the largest and most comprehensive collection of technical information in the world. There is more practical, commercial, timely process information assembled here than is available from any other source. The technical information obtained from a patent is extremely reliable and comprehensive; sufficient information must be included to avoid rejection for "insufficient disclosure." These patents include practically all of those issued on the subject in the United States during the period under review; there has been no bias in the selection of patents for inclusion.

The patent literature covers a substantial amount of information not available in the journal literature. The patent literature is a prime source of basic commercially useful information. This information is overlooked by those who rely primarily on the periodical journal literature. It is realized that there is a lag between a patent application on a new process development and the granting of a patent, but it is felt that this may roughly parallel or even anticipate the lag in putting that development into commercial practice.

Many of these patents are being utilized commercially. Whether used or not, they offer opportunities for technological transfer. Also, a major purpose of this book is to describe the number of technical possibilities available, which may open up profitable areas of research and development. The information contained in this book will allow you to establish a sound background before launching into research in this field.

Advanced composition and production methods developed by Noyes Data are employed to bring these durably bound books to you in a minimum of time. Special techniques are used to close the gap between "manuscript" and "completed book." Industrial technology is progressing so rapidly that time-honored, conventional typesetting, binding and shipping methods are no longer suitable. We have bypassed the delays in the conventional book publishing cycle and provide the user with an effective and convenient means of reviewing up-to-date information in depth.

The table of contents is organized in such a way as to serve as a subject index. Other indexes by company, inventor and patent number help in providing easy access to the information contained in this book.

16 Reasons Why the U.S. Patent Office Literature Is Important to You

1. The U.S. patent literature is the largest and most comprehensive collection of technical information in the world. There is more practical commercial process information assembled here than is available from any other source. Most important technological advances are described in the patent literature.
2. The technical information obtained from the patent literature is extremely comprehensive; sufficient information must be included to avoid rejection for "insufficient disclosure."
3. The patent literature is a prime source of basic commercially utilizable information. This information is overlooked by those who rely primarily on the periodical journal literature.
4. An important feature of the patent literature is that it can serve to avoid duplication of research and development.
5. Patents, unlike periodical literature, are bound by definition to contain new information, data and ideas.
6. It can serve as a source of new ideas in a different but related field, and may be outside the patent protection offered the original invention.
7. Since claims are narrowly defined, much valuable information is included that may be outside the legal protection afforded by the claims.
8. Patents discuss the difficulties associated with previous research, development or production techniques, and offer a specific method of overcoming problems. This gives clues to current process information that has not been published in periodicals or books.
9. Can aid in process design by providing a selection of alternate techniques. A powerful research and engineering tool.
10. Obtain licenses—many U.S. chemical patents have not been developed commercially.
11. Patents provide an excellent starting point for the next investigator.
12. Frequently, innovations derived from research are first disclosed in the patent literature, prior to coverage in the periodical literature.
13. Patents offer a most valuable method of keeping abreast of latest technologies, serving an individual's own "current awareness" program.
14. Identifying potential new competitors.
15. It is a creative source of ideas for those with imagination.
16. Scrutiny of the patent literature has important profit-making potential.

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INTRODUCTION

Pigments have been used for thousands of years for a wide range of purposes. During this time a variety of materials have been tried as pigments with varying degrees of success.

Inorganic pigments are finely powdered, insoluble, solid particles which are used to color another material by being mixed with the material or by application in a thin layer over its surface. Inorganic pigments are used today in many industries to impart a desirable color and appearance to media such as paints, inks, varnishes, lacquers, glazes, organic resins, ceramics, etc. or as opacifiers in paint and paper.

Desirable properties in a pigment include strength (so that only a small quantity of pigment is required for mixing with a white pigment to make tints), purity of shade with absence of dullness, lightfastness, resistance to bleeding and good hiding power. Not all pigments are suitable for all purposes. For a particular application, one pigment may be superior to another because of color or hiding power. For another use, the properties of intensity or lightfastness may determine the pigment of choice.

Inorganic pigments, because they are more stable to light and temperature than organic pigments, have a greater scope of application. They are required for use in ceramics and glazes, and for coloring thermoplastic resins manufactured at high temperatures.

In paper manufacturing, pigments and fillers are applied to increase brightness and opacity and to enhance smoothness of the paper. The pigments and fillers are preferably supplied as high solids concentration aqueous slurries, which must be stabilized against settling and forming a cake in the storage tank.

This book is concerned with the search for new pigments as well as with modifications of known pigments which will result in making available pigments of superior properties. Included are processes for the production and improvement of titanium dioxide pigments, chrome yellow pigments, iron oxide pigments, car-

bon black pigments, mineral pigments such as clays and silicates, etc. In addition, the book relates also to pigments useful for special purposes (anticorrosion, opacifiers, protective coatings, lustrous pigments for cosmetics, pigments for coloring ceramics, synthetic polymers, synthetic fibers, etc.). Processes for facilitating the dispersion of pigments in aqueous organic liquids are of particular importance. Of interest, too, are new pigment compositions and composites of high performance at low cost.