



# Hydration analysis of phosphogypsum cementitious materials: mechanisms of mechanical property changes under water resistance experiments

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Received: 6 July 2024  
Accepted: 30 December 2024  
Published online:  
6 January 2025

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part of Springer Nature, 2025

## ABSTRACT

Phosphogypsum is restricted as a building material because of its poor water resistance. In this study, phosphorus building gypsum, cement, and lime were used as the main materials, and water reducer and retarder were used as additives to prepare phosphorus gypsum cementitious materials under low water-cement ratio. Concurrently, the mechanical properties and hydration mechanism of phosphogypsum cementitious materials were investigated during both hydration and soaking processes, alongside a discussion on optimization strategies for enhancing their water resistance. The findings indicate that under low water-cement ratio conditions, rapid hydration of a substantial amount of phosphorus building gypsum occurs, leading to the formation of a spatial skeleton and significant enhancement in compressive strength. Some segments of the phosphorus building gypsum hydration process experience delay or cessation, while certain constituents of cement are densely packed, forming a compact system. Submerging in clear water gradually provides an adequate water environment, allowing for complete hydration of both phosphorus building gypsum and cement components, effectively filling the pores. Water immersion results in a material loss in the phosphogypsum cementitious system, leaving the pores formed after dissolution incompletely filled. In low water-cement ratio phosphogypsum cementitious systems, the secondary hydration process avoids exposure to a flowing solution environment, thereby circumventing material loss and achieving a complete and dense phosphogypsum cementitious system.

Handling Editor: Andria de Camargo

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<https://doi.org/10.1007/s10853-024-10590-y>

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# Materials Mechanisms Of Supercondu P

**P. Vincenzini**

## **Materials Mechanisms Of Supercondu P :**

### **Materials and Mechanisms of Superconductivity - High Temperature Superconductors** Yu-Sheng He, 1997-09-12

The discovery of high temperature superconductivity has not only opened many possibilities for potential technical applications but has also provided a unique challenging research subject for condensed matter physics and material sciences. High temperature superconductivity appears in systems with strong electron correlation and constitutes one of the key issues in condensed matter physics. The understanding of its mechanism will therefore greatly promote the future developments of this branch of science. During the last ten years great progress has been made in both fundamental and application oriented research. Expanding knowledge of the physical properties in the superconducting as well as the normal state in preparing the way to an understanding of the underlying mechanisms. The accumulated experience in materials processing enables technical applications. All these aspects of high  $T_c$  superconductivity and recent work on traditional superconductors have been exposed at the Beijing conference. The present volume is a separate edition of part I of the extensive Proceedings of the Fifth International Conference on Materials and Mechanisms of Superconductivity High Temperature Superconductors. It contains the plenary tutorial and invited papers and gives a comprehensive account of the state of the art as of March 1997.

Superconductivity Adir Luiz, 2011-07-18 Superconductivity was discovered in 1911 by Kamerlingh Onnes. Since the discovery of an oxide superconductor with critical temperature  $T_c$  approximately equal to 35 K by Bednorz and Muller 1986 there are a great number of laboratories all over the world involved in research of superconductors with high  $T_c$  values the so called High  $T_c$  superconductors. This book contains 15 chapters reporting about interesting research about theoretical and experimental aspects of superconductivity. You will find here a great number of works about theories and properties of High  $T_c$  superconductors materials with  $T_c$  30 K. In a few chapters there are also discussions concerning low  $T_c$  superconductors  $T_c$

**Scientific and Technical Aerospace Reports**, 1995 Lists citations with abstracts for aerospace related reports obtained from world wide sources and announces documents that have recently been entered into the NASA Scientific and Technical Information Database

*Physics Briefs*, 1992

Mechanisms of Superconductivity Yoshio Muto, 1992

**High Temperature Superconductor Thin Films--growth Mechanisms-interfaces-multilayers** H.-U. Habermeier, Michael L. Hitchman, 1997 Hardbound The four day EMRS Spring Meeting in Strasbourg France June 4-7 1996 Symposium on High Temperature Superconductor Thin Films Growth Mechanisms Interfaces Multilayers was held in conjunction with the Third Workshop in Europe. The benefit of including the Workshop into the Symposium was the advantage of bringing in an additional far larger and disciplinarily more diverse audience and through the organization of the workshop receiving invited and contributed lectures as well as posters which was supplemental to the main Symposium. The Symposium focused on the specific topics of growth interfaces and multilayers and highlighted the continuing need for there to be active interplay between chemists designing new precursor molecules and depositing thin films and engineers applying HTS materials with

deficiencies and limitations to commercially oriented devices The majority of papers presented at the Symposium are included in these pro *Handbook of Thin Film Materials: Semiconductor and superconductor thin films* Hari Singh Nalwa,2002 **Advanced Materials and Processes** Dragan P. Uskovic,Slobodan K. Milonjić,Dejan I. Raković,1998 Modern Technology depends upon modern materials Life as we know it would hardly be possible without the progress that has been made in cutting edge materials science This is true of both the various theoretical aspects and of the practical engineering applications **Superconductivity and Superconducting Materials Technologies** P. Vincenzini,1995 **Engineered Materials Abstracts** ,1993-04 *Superconductivity* ,1992 *Energy Research Abstracts* ,1977 Semiannual with semiannual and annual indexes References to all scientific and technical literature coming from DOE its laboratories energy centers and contractors Includes all works deriving from DOE other related government sponsored information and foreign nonnuclear information Arranged under 39 categories e g Biomedical sciences basic studies Biomedical sciences applied studies Health and safety and Fusion energy Entry gives bibliographical information and abstract Corporate author subject report number indexes *Progress in Light Metals, Aerospace Materials and Superconductors* Siyuan Long,Xinming Zhang,Yafang Han,Chaoqun Peng,2007 This immense 4 volume set comprises 495 peer reviewed papers divided into four parts Magnesium Part 1 Aluminum Alloys Part 2 Aerospace Materials Part 3 and Superconducting and Functional Materials Part 4 *Science & Technology in Japan* ,1992 **Soviet Physics, Uspekhi** ,1989 *INIS Atomindex* ,1988 *Nature* Sir Norman Lockyer,1928 *Journal of the Physical Society of Japan* ,2016 *Oxide Superconductor Physics and Nano-engineering II* Ivan Bozovic,Davor Pavuna,1996 **The British National Bibliography** Arthur James Wells,1998

This book delves into Materials Mechanisms Of Supercondu P . Materials Mechanisms Of Supercondu P is a crucial topic that needs to be grasped by everyone, from students and scholars to the general public. The book will furnish comprehensive and in-depth insights into Materials Mechanisms Of Supercondu P , encompassing both the fundamentals and more intricate discussions.

1. This book is structured into several chapters, namely:

- Chapter 1: Introduction to Materials Mechanisms Of Supercondu P
- Chapter 2: Essential Elements of Materials Mechanisms Of Supercondu P
- Chapter 3: Materials Mechanisms Of Supercondu P in Everyday Life
- Chapter 4: Materials Mechanisms Of Supercondu P in Specific Contexts
- Chapter 5: Conclusion

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4. In chapter 3, this book will examine the practical applications of Materials Mechanisms Of Supercondu P in daily life. This chapter will showcase real-world examples of how Materials Mechanisms Of Supercondu P can be effectively utilized in everyday scenarios.
5. In chapter 4, this book will scrutinize the relevance of Materials Mechanisms Of Supercondu P in specific contexts. The fourth chapter will explore how Materials Mechanisms Of Supercondu P is applied in specialized fields, such as education, business, and technology.
6. In chapter 5, this book will draw a conclusion about Materials Mechanisms Of Supercondu P . This chapter will summarize the key points that have been discussed throughout the book.

The book is crafted in an easy-to-understand language and is complemented by engaging illustrations. This book is highly recommended for anyone seeking to gain a comprehensive understanding of Materials Mechanisms Of Supercondu P .

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