

Optical Separation Process



Article Overview

Optical separation methods exploit differences in optical properties or chirality to isolate specific substances, ranging from particle sorting to enantiomeric resolution.

Physical Optical Separation

Physical optical separation is commonly used in mineral processing and materials handling. This method relies on differences in color, reflectivity, or fluorescence of particles. For example, particles with contrasting colors (like black and white) can be separated using optical sensors and electro-optic detectors, which detect differences in visible or infrared light responses, allowing automated sorting of minerals or other materials based on optical contrast (Britannica) . Spectroscopic techniques are also considered optical methods of analysis. These include:

- Colorimetry: Measures light absorption by colored solutions.
- Spectrophotometry: Measures absorption at specific wavelengths.
- Atomic absorption analysis: Measures light absorption by free atoms.
- Fluorimetry: Quantifies fluorescent substances in a sample (Studocu) . These methods are widely used in analytical chemistry to quantify substances and can be adapted for separation when combined with selective detection.

Chemical Optical Separation (Chiral Resolution)

In chemistry and pharmaceuticals, optical separation often refers to resolving racemic mixtures into individual enantiomers. Methods include:...

Article Content

Jul 08, 2026

All-optical logic processing unit using Kerr nonlinearity of MXene

Here, we present an electrically reconfigurable all-optical logic processing unit that leverages the Kerr nonlinear effect

Aug 29, 2025

Creating optical centrifuge for particle clearing and separation ...

Abstract Optical centrifuge has recently experienced growing attention as a promising tool for optically manipulating

Dec 04, 2025

Enantioselective Separation and Negative Transport of Chiral Particles ...

This work proposes an all-optical strategy that leverages a tailored optical needle field for the enantioselective

Feb 22, 2026

Separation processes

Separation processes are based on the theory of vapor-liquid equilibrium. This theory states that streams leaving a

Oct 21, 2025

NOVEL METHODS FOR THE SEPARATION OF OPTICAL ISOMERS

Recent techniques for separation of optical isomers include resolution, kinetic resolution (including enzymatic methods), asymmetric

Apr 26, 2026

Optical separation | Britannica

This process is used for the concentration of particles that have sufficiently different colours (the best contrast being black and white)

Mar 30, 2026

6.8: Resolution (Separation) of Enantiomers

Separation of racemates into their component enantiomers is a process called resolution. Since enantiomers have identical physical

Jun 23, 2026

Strategies for chiral separation: from racemate to enantiomer

Chiral separation has become a crucial topic for effectively utilizing superfluous racemates synthesized by chemical

Nov 19, 2025

Separation Technology

Optical separation technology, which has been used in the process of separating glass, is a method of separating materials by using

Jun 12, 2026

Optical sorting: past, present and future | Light: Science & Applications

In this paper, we concentrate on an archetypal sorting method—optical sorting—which integrates optical tweezers

Jul 21, 2026

Separation von Kunststoffgranulaten | SEPARATION AG

How we are ready to face the challenges of the plastics industry now and in the future, how innovative

Aug 26, 2025

Optical sorting

Optical sorting (sometimes called digital sorting) is the automated process of sorting solid products using

Jan 28, 2026

Cross-Type Optical Particle Separation in a Microchannel

Imasaka et al. developed a simple optical particle separation method, termed optical chromatography, which can

Nov 11, 2025

Creating optical centrifuge for particle clearing and separation ...

Herein, we report a novel optical centrifuge, which is driven by optical force arising from transverse phase gradient of

May 28, 2026

Optica Publishing Group

Spotlight on Optics More > Optics Continuum Full-color structural colors with high purity via a Fano resonance optical platform

Dec 09, 2025

Optical sorting: past, present and future | Light: Science & Applications

This review offers a comprehensive overview of the history, development, and perspectives of various optical sorting

Sep 29, 2025

Dark-based optical sectioning assists background removal in ...

The Dark sectioning algorithm removes the background and provides single-frame optical sectioning in fluorescence

Jul 27, 2026

Theory of the optical spatial separation of racemic mixtures of chiral ...

We propose a practical way of spatially separating a ("racemic") mixture of left-handed (L) and right-handed (R) chiral

Jun 19, 2026

Separation process

A separation process is a method that converts a mixture or a solution of chemical substances into two or more distinct product

Aug 08, 2025

Lab Optical Separation Testing Service

Optical Separation Asia-Africa International offers mineral optical sorting services that play a crucial role in

Jul 30, 2025

Separation von Kunststoffgranulaten | SEPARATION AG

Separation process for plastic granules The smallest detail is our greatest strength. We focus on quality

Jul 08, 2026

Optical Separation: A Comprehensive Overview

Optical separation encompasses a range of techniques that utilize the interaction of light with matter to segregate components of a

Oct 14, 2025

Recent developments in optical resolution

Since the first separation of enantiomers by Louis Pasteur in 1848, a continuous search for new and efficient resolution

Jul 02, 2026

Optical isolator

The operation of conventional optical isolators relies on the Faraday effect (which in turn is produced by

Nov 21, 2025

Separation of isotopes by laser excitation

Separation of isotopes by laser excitation (SILEX) is an experimental process for producing enriched uranium. It is strongly

Jun 27, 2026

Principles of chromatography | Stationary phase (article)

Chromatography is a separation technique that every organic chemist and biochemist is familiar with. I, myself, being an organic

Jun 01, 2026

Separation of Chiral Compounds: Enantiomeric and Diastereomeric ...

Despite the dramatic development of enantioselective synthesis and chromatographic separation methods, optical

Mar 11, 2026

Optical Analysis & Separation Methods Notes for CHEM 101

Optical Methods of Analysis Introduction: Optical methods are spectroscopic techniques that are based on the absorption or

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