## THE MOST UNIVERSAL MODERN MATERIAL

Glass has transformed the development of modern civilization in more ways than you may realize.

# **Glass and Our Daily Lives**

Glass materials impact every major industry of modern civilization and scientific discovery, including developments of medical and space sciences, the internet, and computers. Our lives would be very different if there were no materials made of glass.



## **How Glass is Formed**

To form a glass, minerals (sand) are mixed and heated to high temperatures to form a sludge-like melt. Upon fast cooling, the mixture solidifies but the atoms remain in a disordered liquid arrangement. The lack of long range atomic order (called non-crystalline) is characteristic of the glassy state.

Composition of Window Glass



Naturally Forming Glass





### Anti-Reflective Coating Vivid Color Emitter



## Construction Material



Satsuma Kiriko

Renaissance Glass

Venetian Glass

Colored Glass

Roman Glass

Cut Glass



Solar Cell Cover Glass



Turning Alchemy into Science



Discovering Microorganisms

Improving Human Vision

Glass in our

**Daily Lives** 

Temperature



**Health Care** 



Chemical Storage













SUSTAINABLE GOALS

Worldwide







Improving Mobile Devices

Processing with Light

Science &

**Technology** 

Diagnostic Tool

Drawing in the nanoscale

Calculating with Electrons

Detecting Gravitational Waves

Surgical Glass

Strage Images

Communicate with Image

Amplifying Light

Optical Fiber Amplifier

First Aid

Signalling with Light

Seeing Through Objects

Observing from Outer Space

Detecting Elementary

Creating High Intensity Light

Particles

**Exploring the Cosmos** 





Solar Cell Paddle for

Redefining Possibilities

Smart Eyeglasses



# To learn more, we invite you to visit our website.

Learn more about glass science, manufacturing, & critical uses in vour daily life





High-Brilliance Dishware



Pioneer of Modern Art



Art Nouveau Glass Artifacts



Cathedral Glass







Treasure of Tutankhamun



Lycurgus Cup



Glass First Created for Daily Life









Manipulating Light

### 19th Century

Illuminating the Dark

Light Bulb

light bulbs, TV vacuum t and the invention of the co

# 20th Century

# 21st Century - Present

Glass enables the continual

# Obsidian Arrowhead (~10,000 years ago)

Glass is Naturally **Forming** 

### ~5,000 years ago

Humans Forming Glass

These are also glassy states!

Metals, organic matter, and living things can also be in a "glassy" state. When cells are in a glassy state, they are less likely to be destroyed by evaporation or freezing, so glass is used for the dormancy of organisms and long-term preservation of food.

13th - 17th Century

# Hands-On with Glass

Calculations are possible due to irregularly orientated ultrafine magnets which can be described as a glassy state.











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Building a Sustainable

**Future** 



Composition of Earth's Crust

# 学習資料「一家に | 枚 ガラス」:The annual S&T poster for everyone, littled "Glass -One S&T Poster for Every Household-"

Production & Ministry of Education, Culture, Sports, Science and Technology, Japan

Cooperation with Planning Setsuhisa Tanabe (Kyoto Univ.) Kazuhiko Ishimura (AIST) The First Edtion Launched: March 2022

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