

☰ Topic Page: [metamorphic rock](#)

Definition: **metamorphic rock** from *The Penguin Dictionary of Science*

One of the three main types of rock: metamorphic rock has been changed by a number of processes such as heating or high pressure. Metamorphic rocks are significant because they constitute a large part of the continental crust. Examples of metamorphic rock are marble and slate. Compare ►igneous rock; sedimentary rock.

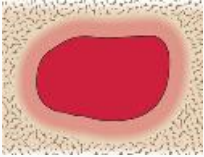


Image from: [Contact metamorphic aureole](#) in [Guide to Minerals, Rocks and Fossils](#)

Summary Article: **metamorphic rocks**

From *Encyclopedia of Environmental Change*

Rocks that have been altered in the solid state (recrystallised) as a result of changes in temperature, pressure and/or chemical environment (e.g. hydrothermal effects). *Recrystallisation* involves changes to minerals and to their texture (shape or arrangement). Most metamorphic rocks have a crystalline texture and a distinctly anisotropic fabric. *Contact metamorphism* converts rocks in a *metamorphic aureole* adjacent to an igneous intrusion into *hornfels*. *Regional metamorphism* results from heat and stress during orogenesis. mudstone is converted into *phyllite*, *slate*, *schist* and *gneiss* with increasing degree of metamorphism. Basic igneous rocks are altered to *amphibolite*, sandstone to *psammite* or, if rich in quartz, to *metaquartzite* and limestone to *marble*. *Dynamic metamorphism* results from rock deformation and forms rocks such as *mylonite* in fault zones. Other categories of metamorphism are summarised in the Table.

Much of the geological record, particularly of the precambrian, is preserved in metamorphic rocks, and their interpretation yields important information about the evolution of environments, the atmosphere, past climate and *life* on Earth. *Orogenic metamorphism* in the past may have been associated with the release of carbon dioxide into the atmosphere: although the significance of this process is controversial, it suggests that metamorphism may have a long-term effect on climatic change. Although usually considered in relation to rocks, metamorphic processes also underlie the crystalline transitions between *snow*, *firm* and *glacier ice*.

Metamorphic rocks Types of metamorphism associated with the formation of metamorphic rocks.

<i>Location</i>	<i>Process</i>	<i>Description</i>
Local metamorphism	<i>Contact metamorphism</i>	Metamorphic rocks adjacent to and clearly related to igneous rocks
	<i>Dynamic metamorphism</i>	Metamorphic rocks associated with severe deformation along fault or shear zones
	<i>Impact metamorphism</i>	Metamorphic rocks associated with high pressure-temperature regimes caused by meteorite impact
	<i>Micro-contact metamorphism</i>	Small-scale changes due to high-temperature lightning strikes (creating fulgurites)
Regional metamorphism	<i>Orogenic metamorphism</i>	Metamorphic rocks formed in association with subduction and collision-related zones of orogenesis
	<i>Burial metamorphism</i>	Metamorphic rocks buried in sedimentary basins, where higher pressures and temperatures have formed new minerals
	<i>Oceanic metamorphism</i>	Metamorphic rocks altered by circulating heated seawater driven by hydrothermal activity at midoceanic ridges (MORs)

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[See *also* greenstone belt, sedimentary rocks]

Best, MG (2003) *Igneous and metamorphic petrology*. Oxford: Blackwell.

Bucher, K; Grapes, R (2011) *Petrogenesis of metamorphic rocks*, 8th edition. Berlin: Springer.

Fettes, D; Desmons, J (eds) (2007) *Metamorphic rocks: A classification and glossary of terms*. Cambridge: Cambridge University Press.

Fry, N (1991) *The field description of metamorphic rocks*. Bath: Geological Society.

Kerrick, DM; Caldeira, K (1998) Metamorphic CO₂ degassing from orogenic belts. *Chemical Geology* 145: 213-232.

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Hunt, J. B. (2014). metamorphic rocks. In J. A. Matthews, *Encyclopedia of environmental change*. London, UK: Sage UK. Retrieved from https://search.credoreference.com/content/topic/metamorphic_rock

APA

Hunt, J. B. (2014). metamorphic rocks. In J. A. Matthews, *Encyclopedia of environmental change*. London, UK: Sage UK. Retrieved from https://search.credoreference.com/content/topic/metamorphic_rock

Chicago

Hunt, John B. "metamorphic rocks." In *Encyclopedia of Environmental Change*, by John A. Matthews. Sage UK, 2014. https://search.credoreference.com/content/topic/metamorphic_rock

Harvard

Hunt, J.B. (2014). metamorphic rocks. In J.A. Matthews, *Encyclopedia of environmental change*. [Online]. London: Sage UK. Available from: https://search.credoreference.com/content/topic/metamorphic_rock [Accessed 18 November 2019].

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Hunt, John B. "metamorphic rocks." *Encyclopedia of Environmental Change*, John A. Matthews, Sage UK, 1st edition, 2014. *Credo Reference*, https://search.credoreference.com/content/topic/metamorphic_rock. Accessed 18 Nov. 2019.