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### What solutions/things does calcium carbonate dissolve in?

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A2a from [User-10514534341264165525](#), thanks.

It dissolving in water is so low ( only 0.013 g/L ) that is labeled by most as insoluble in water.

Some say it dissolves in (strong) acids, well ... Yes & no;

that is not really just dissolving, you can't remove that solvent and get your CaCO3 back; that is called a reaction, making CO2 gas + a Calcium salt.

So if some CaCO3 has formed a precipitation in lets say water pipes in your house or in a steam boiler, you can remove it by circulating an acid solution trough those pipes, but it is a "reaction" not "dissolving", in chemical terms.

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 **Edward Melaika**, B.S. Chemistry, Massachusetts Institute of Technology (1953)

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Calcium carbonate is not soluble in water. It will dissolve in an acid solution. In doing so, the carbonate portion is converted to carbon dioxide gas which escapes.

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 **Lawrence C.**, Masters in Econ from Columbia, FinTech at Masterworks  
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**Gary McAdam**, B.Sc Chemistry, The University of Liverpool (1989)  
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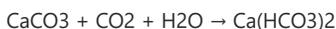
It's not very soluble in water or alkaline solutions, but will dissolve in (and react with) dilute acids - it will convert to the calcium salt on the acid concerned, water and carbon dioxide gas

**Peter Hand**, lives in Las Vegas  
Answered 5 years ago · Upvoted by Craig Cornelius, Ph.D. Chemistry, Stanford University · Author has **10.1K** answers and **32.6M** answer views

**Related What happens when you add water to calcium carbonate?**

Originally Answered: Does calcium carbonate react with water?

Calcium carbonate doesn't react with pure water, but it does react with carbonic acid, that is, water with dissolved carbon dioxide, to produce soluble calcium bicarbonate.



That is how caves form in limestone, and how stalagmites and stalactites form from dripping water in those caves. The dissolved calcium bicarbonate is the principle mineral in hard water. It dissociates back to calcium carbonate when the water is boiled, causing lime scale.

**Mike Jones**, MAEd Chemistry & Physics, Western Carolina University (1974)  
Answered 2 years ago · Author has **6.2K** answers and **4.3M** answer views

**Related Why does calcium carbonate dissolve in hydrochloric acid?**

I'm not sure I would use the term "dissolve." I'd go for "react." Calcium carbonate undergoes a chemical reaction with hydrochloric acid. The reaction results in the formation of carbon dioxide gas and leaves calcium ions and chloride ions in solution. Just about any carbonate salt will react with just about any acid to liberate CO2 gas.



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Updated Apr 20, 2022

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**Mark Harder**, Polymath, lives in Oregon  
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If you've ever taken a pH measurement of distilled or de-ionized water you'd have seen that it isn't neutral. It's slightly acidic because carbon dioxide dissolves in it, a reaction that happens rapidly whenever water is exposed to air. Carbon dioxide is actually an **acid anhydride**. It

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 **Boris Bartlog**, lived in Dorena, OR (2013-2020)  
Answered 4 years ago · Author has **4.8K** answers and **5.2M** answer views

**Related Why is only the HCL chosen for dissolving calcium carbonate?**

I'll give you the drawbacks of other acids someone might consider using:

Sulfuric acid: coats the outside of your calcium carbonate with insoluble calcium sulfate as the reaction proceeds, so it can't go to completion without very finely powdered calcium carbonate or extensive mechanical agitation.

Acetic acid: the reaction is really, really slow. Got a couple of days to wait around?

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 **Wayne Kelley**, Diploma Chemistry & Industrial Processes, British Columbia Institute of Technology (2006)

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**Related How do you prepare a sample of calcium carbonate? Apparently, a two-stage experiment is required.**

It really depends on where you start.

You could start you could start directly from calcium but that would take more steps than just two.

If you start with calcium oxide and slake it in water this becomes calcium hydroxide filter off the solids bubble carbon dioxide through the resulting solution the white precipitate is calcium carbonate. What part I thought was interesting about this series of reactions is that if you take your calcium carbonate and heat it up and drive off the carbon dioxide, again you start back at calcium oxide.

Cheers,

Wayne

1

 **Rob Hooft**, PhD in structural chemistry using molecular modeling and X-ray diffraction.

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That is impossible to answer without a great deal more information.

The speed of any chemical reaction is strongly dependent on the temperature, the degree of mixing, and, in case of solids, the particle size. Without all that information it is impossible to say how long it takes. Here, you are mixing a solid, a liquid and a gas! Furthermore, in this case the resulting concentration also changes the speed of the reaction.

The result: reaction times that differ by over 7 orders of magnitude:

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**Jim Griepenburg**, chemistAnswered 5 years ago · Author has **5.8K** answers and **3.4M** answer views

Related **How do you make calcium carbonate soluble?**

The solubility of  $\text{CaCO}_3$  is a property of  $\text{CaCO}_3$  and does depend on the temperature and the solvent. If your question is "How does one dissolve  $\text{CaCO}_3$  [or anything else for that matter] one must study the equilibrium in the solubility equation and determine how to perturb the

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**Meg Osterby**, former Chemistry/Biochemistry/Chemical Safety Instructor (2000-2017)Answered 1 year ago · Author has **4.5K** answers and **2.4M** answer views

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The calcium in calcium citrate is better absorbed than that in calcium carbonate. But the calcium in dairy is even better absorbed. It's always better, if possible, to get the nutrients you need from actual food rather than supplements.

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**Aidan Cooney**, PhD Chemistry & Physical Organic Chemistry, Durham University (1987)Answered 3 years ago · Upvoted by Saurabh Dixit, M.Sc. Chemistry, Dr. Ram Manohar Lohia Avadh University (2010) · Author has **553** answers and **878.5K** answer views

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Whether a relatively ionic compound dissolves in water depends on two factors.

The lattice energy (which is the energy required to separate the ions.

secondly the hydration energy whose name is self-explanatory.

calcium carbonate has a relatively high lattice energy compared to say NaCl.

The lattice energy is always +ve because it requires energy to overcome the charges pulling the ions together

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**John Hogg**, studied Materials Science and Engineering at San Jose State UniversityAnswered 1 year ago · Author has **826** answers and **163.7K** answer views

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Calcium carbonate,  $\text{CaCO}_3$ , dissolves in acids, yes. Carbonated water has (weak) carbonic acid,  $\text{H}_2\text{CO}_3$ , in it. So, more of (highly insoluble) calcium carbonate will dissolve in it. Apparently,  $\text{CaCO}_3$  also dissolves in aqueous ammonium chloride,  $\text{NH}_4\text{Cl}(\text{aq})$ . BTW, the increasing acidification of the oceans is due to the increase in atmospheric  $\text{CO}_2$  gas from burning fossil

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**S John Hogg**, studied Materials Science and Engineering at San Jose State University  
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Related **How do I remove calcium carbonate from water?**

Being nearly insoluble, there shouldn't be that much CaCO3 in your water to begin with. But acids like hydrochloric acid, HCl, readily dissolve/ionize calcium carbonate. CO2 gas is released in the process:



Once the solution pH rises again however, calcium ion will once again react with dissolved atmospheric CO2 gas. So, you would want to remove the remaining calcium chloride, CaCl2, from solution, maybe by simple evaporation/precipitation. The only other option is to keep your solution sealed off from the atmosphere — if possible.

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**Harish Prabhu R**, Proud INDIAN | Chemist | Spiritual | Simple :)  
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Related **Does CO2 (carbon dioxide) dissolve in water?**

Yes, it does! In CO2, due to electronegativity difference oxygens have slight -ve charge, hence surrounded by polar water molecule forming a cage structure. This leads to its solubility. It is a slow process and needs high pressure to achieve greater dissolution. Not all CO2 molecules get dissolved, fraction of those reacts to form carbonic acid H2CO3. This reaction is also slow. In case of carbonated beverages, acidic pH is due to carbonic acid and bubble formation while opening is due to escaping CO2.

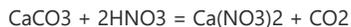


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**E Edward Coulter**, lived in Richmond Hill, ON (1964-1997)  
Answered Feb 15, 2022 · Author has 258 answers and 89.6K answer views

Related **What is a way to dissolve the salts of calcium carbonate and calcium phosphate?**

At the risk of misunderstanding your question I would say that dissolving calcium carbonate in nitric acid would answer for calcium carbonate.



Other acid can be used such as HCl, acetic, etc. Calcium nitrate is very soluble in water but

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