Supply of large calcium carbonate marble chips

Posted by Anonymous on Tue, 2015-02-10 18:40

Supply of large calcium carbonate marble chips: I have been asked to purchase large calcium carbonate marble chips, as the chem supply ones are the wrong size. any suggestions??

P.S. The teacher would like to heat them.

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Large Calcium Carbonate Marble chips

Submitted by on 23 February 2015

Answer reviewed 8 February 2023

You are correct, the usual chemical suppliers for schools only list marble chips up to 10mm. When you are looking for larger chips for use in a Kipp's apparatus for generating carbon

dioxide or comparing reaction rates, this is not always useful.

Heating calcium carbonate, marble chips

Here are some links to practical activities for heating calcium carbonate:

- https://edu.rsc.org/experiments/thermal-decomposition-of-calcium-carbonate/704.article[1]
- https://www.creative-chemistry.org.uk/gcse/physical (scroll down to find N-m06-05 Thermal decomposition of calcium carbonate)[2]

Some references suggest using chalk, but not blackboard chalk, which is usually calcium sulphate.[1]

These activities recommend the use of pea-sized pieces of calcium carbonate, in which case, the chemical supplier product would be a suitable size to heat.

Science ASSIST has not trialled this activity and recommends a site-specific risk assessment be conducted. If larger pieces are used, it is recommended that this be trialled prior to being conducted in the classroom.

Possible sources of larger pieces of calcium carbonate marble chips

- Stonemasons: those that works with marble. They may have “offcuts” to dispose of and may be willing to allow you to obtain some. Check that they are using natural marble and not reconstituted marble, as the reconstituted version will have bonding components added.
- Garden Suppliers: many of them have marble/pebbles for decorative landscaping. You will need to check that they are actually marble chips and not quartz, see further information below.
- Scientific suppliers: marble chips may generally measure around the 8 to 15mm in size, so the larger-sized pieces may be selected.

Is it quartz or marble?

On a casual glance, these two may look similar, but they behave very differently. See the Geoscience mineral identification flowchart[3]

Quartz: is one of the two most abundant minerals in the Earth’s crust, its composition is SiO_2.[4]

Marble: is metamorphosed limestone and has a composition of $CaCO_3$.[5]

To identify whether the sample is quartz or marble, here are some simple suggestions.

- Marble (calcite) is crystalline $CaCO_3$, quite isometric and not foliated (or layered). It has a Moh's hardness of 3, so will not scratch steel or glass—whereas quartz (Moh's hardness of 7) will.
- A simple acid test with dilute acid (0.5 to 1M HCl or vinegar) produces bubbles of CO_2 due to the carbonate in calcite/marble/limestone—silica- or quartz-based rocks do not contain carbonate and therefore do not produce CO_2 when dilute acid is added.[6]

Some marble rock specimens from some of the above sources may be too large for your requirements, but marble is relatively soft and easily broken. After conducting a site-specific risk assessment on the crushing of the stones, it can be broken into smaller pieces by wrapping a few stones in a cloth, placing the cloth on a piece of timber that is on a firm surface and hitting firmly with a hammer while wearing appropriate PPE, including safety glasses, until the desired size is obtained.

References

[1] Nuffield Foundation and the Royal Society of Chemistry. (nd) *Thermal decomposition of calcium carbonate.* Retrieved (8 February 2023) from https://edu.rsc.org/experiments/thermal-decomposition-of-calcium-carbonate/704.article

[2] Saunders, N. (2000). *Thermal decomposition of calcium carbonate*. Retrieved from the Creative Chemistry website: https://www.creative-chemistry.org.uk/gcse/physical (scroll down to find N-m06-05 Thermal decomposition of calcium carbonate)

[3] Geoscience Australia, (nd). *Mineral identification flowchart*. Retrieved (8 February 2023) from https://d28rz98at9flks.cloudfront.net/79626/79626.jpg

[4] King, H. (nd). *Quartz*. Retrieved (8 February 2023) from the Geology.com website: https://geology.com/minerals/quartz.shtml

[5] King, H. (nd). *Marble*. Retrieved (8 February 2023) from the Geology.com website: https://geology.com/rocks/marble.shtml

[6] King, H. (nd). *The "Acid Test" for Carbonate Minerals and Carbonate Rocks*. Retrieved (8 February 2023) from the Geology.com website: https://geology.com/minerals/acid-test.shtml

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