

In August 2013, I experimented with ways to make an artificial silcrete by bonding sand with dissolved silica. 'Silica gel' is commonly used in packaging to absorb moisture, usually in the form of tiny beads inside a paper packet. Despite the name, it is not a gel – the beads are extremely hard, made of pure silica. Each bead is covered with microscopic holes that absorb the water.

Several packets of silica gel were emptied into a plastic container; I first attempted to dissolve them using only water. This produced a loud crackling sound but the beads showed no sign of dissolving. I then found that silica is best dissolved with a strong alkali. The easiest to obtain is sodium hydroxide, or 'caustic soda', which is used as a domestic drain cleaner. This was added to the beads and water, producing a strong chemical reaction with lots of heat, fumes and bubbling. After only a few minutes the beads were largely dissolved; the heat was enough to distort a plastic knife used to stir the mixture, as well as the plastic container holding it.

In about 10 to 15 minutes the silica beads completely dissolved, producing a viscous liquid with the consistency of maple syrup; sticky, but still runny, it was very like freshly mixed araldite. The colour came from some of the silica beads that were dyed blue. Two more plastic containers were found, and the liquid was transferred to them. Was Sarsen stone formed in fresh or salt water? Since this is uncertain, I added about half a teaspoon of table salt to one of the containers, stirring until it dissolved.



Finally, silver sand was added and mixed thoroughly until quite stiff. After a few hours the sand settled slightly, leaving excess liquid above it; this was poured off several times. Because it seemed likely that the silica would bond to the plastic containers, the two batches of the mixture needed to be transferred to moulds that could be dismantled. So a large container was filled with fuller's earth cat litter and two rectangular hollows made. With the sand mixture in the hollows, it was then left out in the sun to dry. After three days, the two pieces of 'sarsen stone' were firm enough to be removed from the mould and left to dry further; after six days they were quite solid. The piece that contained salt was marked with an S.



The two pieces were left in a dry garage and checked periodically. After a few months they appeared to be completely dry and quite hard, though it was possible to snap off small pieces by hand. At this stage it was considerably firmer than lime mortar but not as firm as cement. It was left in the garage, and continued to harden. Although one piece contained salt and the other did not, they both appeared identical.

In October 2016, three years after they were made, the two pieces of stone were examined again. Both were now covered with a white 'fur' that could only be crystals of sodium hydroxide. The piece made with salt was now quite soft and crumbly and snapped in half easily; the piece made without salt was extremely hard. Could this suggest that actual sarsen stone was formed in fresh water? The harder of the two pieces was scrubbed with water; it was slippery to handle, so must still be extremely alkaline (the alkali reacts with grease on the fingers to produce soap). Once washed and dried, it resembled mortar made with Portland cement but seemed to be even harder. This is difficult to determine without risking destroying the stone. I will continue to monitor both pieces.

