# ABOUT THIS ISSUE – REDOX

The *Elements* editorial office is located in the middle of a highly productive agricultural region (Washington, USA). Asparagus was harvested a few weeks ago. Cherries are being picked now (and they are delicious). Apples, onions, potatoes will be harvested in late summer/early autumn. When not from this harvest season, most of what is available in our supermarkets will be from last season’s harvest. Even in the dead of winter, one can go to a market to buy a bag of apples, or onions, or potatoes. But have you ever thought about how it is that we are able to buy produce, such as apples, when they are out of season? We all know that storing produce on a kitchen counter or in a refrigerator will eventually result in rotten, dehydrated, or mealy fruits and vegetables. So, how can fruits and vegetables be “fresh” when purchased from a market up to a year post-harvest? The answer to that question lies within the topic of this issue of *Elements*: reduction and oxidation reactions, otherwise known as “redox”.

Photosynthesis, the big daddy of all redox reactions, is used by plants to convert water and carbon dioxide into oxygen and sugars (the food for plants). In order for a plant to grow, it converts those sugars into energy via respiration (also a redox reaction), which it does as follows:

\[
C_6H_{12}O_6 \text{ (sugar)} + 6O_2 \rightarrow 6CO_2 + 6H_2O + 32 \text{ ATP (energy)}
\]

It is this respiration process that allows fruits and vegetables to ripen and age. Ingeniously, the food industry has utilized the power of redox to extend the life of the agricultural produce that we enjoy. Controlled atmosphere (CA) storage is probably the most successful technology introduced to the fruit and vegetable industry in the 20th century. The goal behind CA storage is to slow the ripening (aging) process and allow prolonged storage of fruits and vegetables by lowering the temperature and controlling the atmosphere. The lower temperatures and low-O2 atmospheres of CA storage reduce the rate of respiration, leading to the slowing down of the natural ripening process and, thereby, extending the shelf-life of produce. The addition of CO2 (the byproduct of respiration) both reduces the rate of respiration and inhibits the development and growth of pests and diseases that would normally damage fruits and vegetables.

There are many controlled-atmosphere facilities located near the farms where fruits and vegetables are grown. If you live in an agriculturally productive area, you may often see large truckloads of onions, apples, and other delicious things being transported from farms to nearby CA facilities. This produce is then later sold en masse locally, nationally, and globally. It is an impressive industry, and one that employs millions of workers worldwide. Yet, none of it would be possible without understanding the power of redox.

# CALL FOR PROPOSALS

Every year, *Elements* publishes six thematic issues on subjects related to the broad disciplines of mineralogy, geochemistry, and petrology. Each issue of *Elements* is born from an idea, or point of interest, about a particular area of our science. That idea is then brought to the editorial team who, in turn, discuss it as a potential subject for a future thematic issue.

The successful ideas that get published are those that
- are broadly related to mineralogy, geochemistry, and petrology;
- are interdisciplinary;
- are in established, but progressing, fields;
- are of interest to a broad cross section of readers;
- are not adequately covered by previous issues of *Elements* or that have considerably advanced since that topic was previously covered.

If you have an idea for a future thematic issue of *Elements*, you are most welcome to submit a proposal for consideration. Visit our website to learn more about proposing topics (http://elementsmagazine.org/publish-in-elements-2/).

**Please submit proposals by the end of July 25 for consideration at the next editorial meeting.**

# COVID-19: A COMMENT ON THE ROLE OF SCIENTISTS

When we started finalizing this issue for publication the prospect of a pandemic seemed very distant. In the intervening three months, COVID-19 has come to dominate everything: our conversations, news broadcasts, our working patterns, and our social lives. For many, this has been a tragic time, and we extend our condolences to all those readers of *Elements* who have lost loved ones and colleagues to COVID-19. For scholars, this is an uncertain time, as universities and research organizations take stock of the impact of the pandemic on their activities, and their financial well-being. The dramatic drop in student mobility across the world is already starting to take a toll on university income and may yet pose an existential threat. On a brighter note, it is hard to overlook the benefits of having cleaner air, happier wildlife, and lower global emissions due to our traveling less.

The pandemic has thrown into sharp relief the important role that scientists play in our world, in providing advice, engendering trust, and maintaining hope. COVID-19 has been something of a rollercoaster ride for scientists in this regard. Their myriad advice, often contradictory, has been variously debated, spurned, ridiculed, or uncritically adopted by governments across the world. Public confusion about how science works has been palpable, and increasingly skeptical. Most alarming is the extent to which anyone and everyone can become an “expert”. Even respectable news outlets confuse the informed expertise of a researcher in a pandemic-related field with the subjective opinion of an individual whose main credentials are a degree in “science”. COVID-19 is not an Earth sciences catastrophe (although some colleagues have redirected their efforts in this direction), but it is not so different from, say, a volcanic eruption, earthquake, or extreme climate event. The pandemic has been a sobering reminder that simply working in a broad field does not qualify us to write opinion pieces in newspapers or on Twitter which criticize public policy, question mitigation measures, or predict consequences of apocalyptic proportion. With knowledge comes some degree of responsibility. Informed criticism is valid; reckless prognostication is not.

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