

Objectives

There is a lot of water contaminated with CRMs in the world; Prussian Blue is able to absorb some of them, so water can be cleaned up and we can retrieve CRMs.

Conclusions

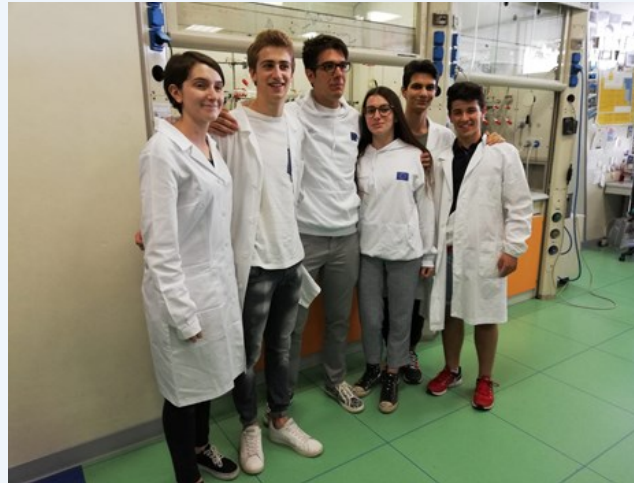
The solution with metals is filtered into a pasteur pipette filled with Prussian Blue: we can see that the droplets that fall on the filter are colorless, even if we treated it with hexacyanoferrate. If the non-filtered solution is treated with hexacyanoferrate it reacts, thus becoming colored. Thanks to this method we can easily repeat the procedure.



Filtered solution with manganese (Mn)

Non-filtered solution with manganese (Mn)

A collaboration between
"Ascanio Sobrero" school
Casale Monferrato (AL)
and CNR-ISTM



Bibliography

- [1] Mohammadreza Shokouhimehr, "Prussian blue Nanoparticles and its Analogues as New-Generation T1-Weighted MRI Contrast Agents for Cellular Imaging", 2010
- [2] https://it.wikipedia.org/wiki/Notte_stellata
- [3] CNR

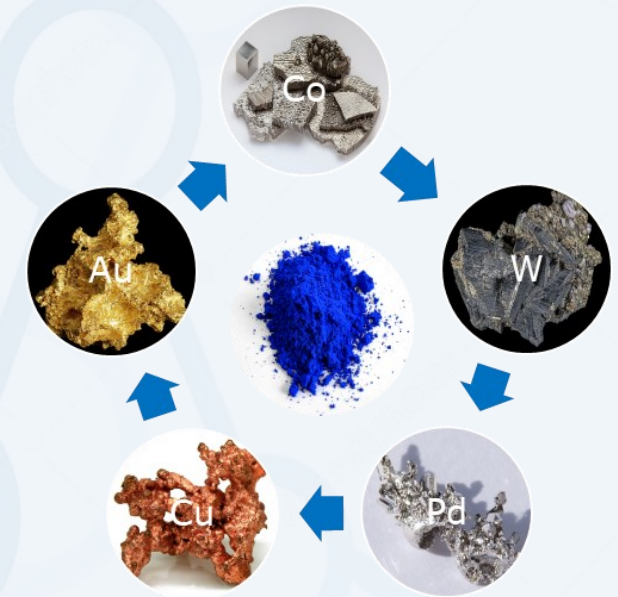
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PRUSSIAN BLUE

Let's make recycling blue

A versatile system for a sustainable recovery of Critical Raw Materials from water



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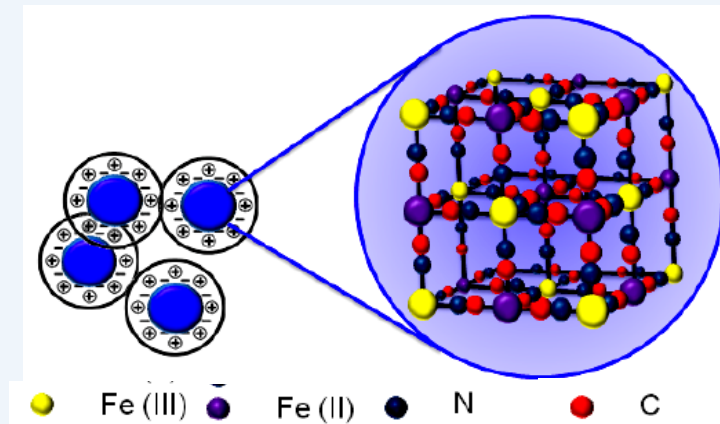


When was Prussian Blue born?

This precious material, which has been used for a lot of years as pigment, was synthesized for the first time in 1706, by a German painter called Diesbach. That is why the colour is also called “Berlin Blue”. The pigment is believed to have been accidentally created when the painter used potash tainted with blood to create some red dye. Later, Prussian Blue was used in a lot of famous paintings such as “The Starry Night”, by Van Gogh.

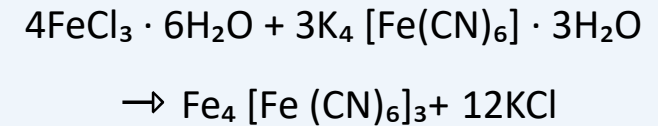
Introduction

Nowadays Prussian Blue can be used to capture critical raw materials in order to recycle them. As a matter of fact these materials are really rare and expensive. Its particular structure can interact with CRMs isotopes and capture them. Actually it is also used in the pharmaceutical sector to soak up dangerous substances in infected hosts.



How to synthesize Prussian Blue molecules

This material can be obtained easily, by using potassium ferrocyanide and ferric chloride.



When potassium ferricyanide is added to the ferric chloride with water, we can immediately see a blue precipitate: this is the insoluble form of Prussian Blue.

This product needs to be filtered and washed with distilled water and acetone for several times, in order to remove the soluble part of Prussian Blue.

What remains is dried up for 20 minutes and afterwards it is ready to be used.