World's strongest acid: 10 million billion times stronger than 100% concentrated sulfuric acid

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While there are many corrosive substances in the world, the ones depicted in movies and on TV are, for the most part, acids. That's because acids are obviously more appealing: bodies are dissolved in them in Breaking Bad; aliens use them as blood in the Alien series. You just don't hear the same about bases - Jack Napier doesn't fall into a vat of sodium hydroxide and emerge as Batman's nemesis, the Joker; it's a green milkshake-like substance simply called 'acid'.

Fact or fiction?

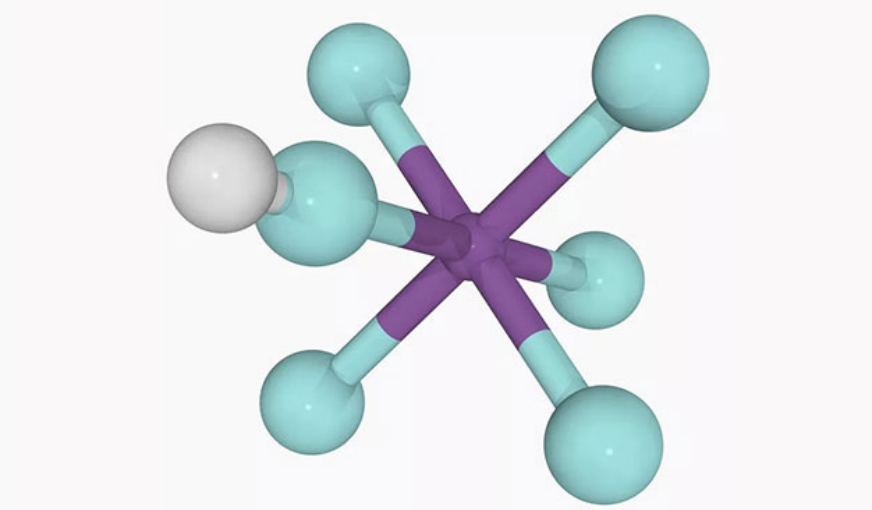
This vagueness is characteristic of acids in fiction, which are largely nameless and generic. So if we want to tackle the question 'what is the world's strongest acid?', we'll need to be a little more specific than in the film.

We'll also need a way to measure and compare the strengths of different acids. And for those of you who think pH is the answer, of course—it only gets us part of the way there. While pH does indeed measure how easily an acid becomes negatively charged when in water, it's only meaningful down to pH 0 and doesn't apply in non-aqueous systems, which is where we need to look for the worst of the bunch.

Acids are chemical compounds that can dissolve in water and have a pH less than 7, have a sour taste, and are often represented by the general formula HxAy. The lower the pH, the stronger the acid, each decrease in pH means the acidity will increase 10 times!

Since the pH scale is limited to 0, people use the Hammett acidity function to measure strong acids (with a pH lower than 0). So what is the strongest acid in the world?

The acid with the lowest pH known to man to date is Fluoroantimonic acid with the chemical formula H2FSbF6 and an index of minus 31.3. This substance has extremely strong acidity that no other acid can match, so it is called a "super acid".



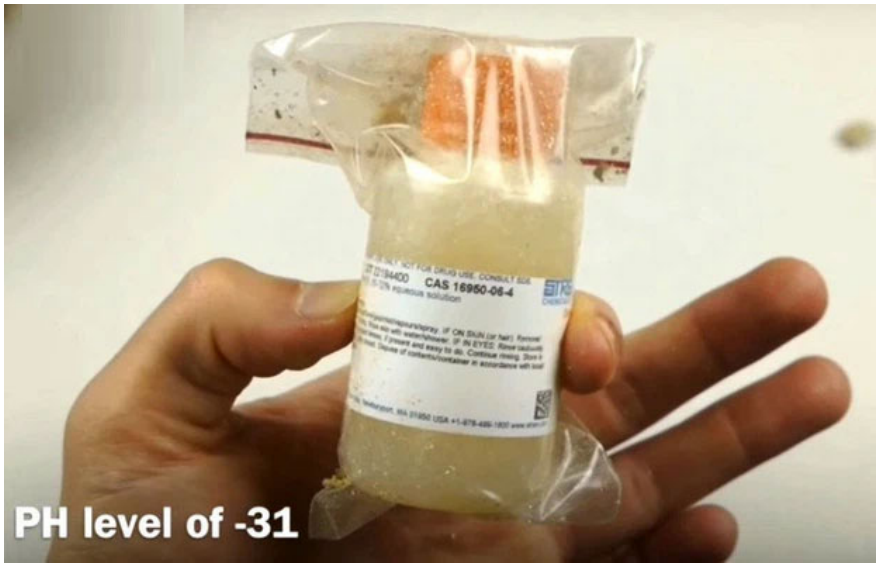
When it comes to acids, many people will immediately think of the familiar strong inorganic acid H?SO? - sulfuric acid. This is a type of acid that can corrode many metals such as iron and aluminum even when diluted and is very dangerous in concentrated form. People must be carefully equipped with everything from shirts, face shields, gloves to PVC aprons before diluting this solution. First, slowly add the acid to the water, stir well, absolutely do not do the opposite or it will be very dangerous.

In nature, it is difficult to find an acid stronger than sulfuric acid. However, it is nothing compared to the world's strongest super acid Fluoroantimonic.

Fluoroantimonic acid is synthesized by mixing hydrofluoric acid (HF) with antimony pentafluoride (SbF_5) in a 1:1 ratio.

Fluoroantimonic acid is 10 to the 16th power (10 quadrillion) times stronger than 100% concentrated sulfuric acid! This super strong acid cannot be stored in a bottle like other acids because it can destroy almost all organic compounds and even the container itself.

Therefore, to contain this super acid, people must use a synthetic polymer Polytetrafluoroethylene PTFE, also known as Teflon.



This acid decomposes rapidly and explodes when exposed to water, so it cannot be used in aqueous solvents. Therefore, this superacid can only be used in hydrofluoric acid environments.

When the temperature increases, Fluoroantimonic acid decomposes and produces the highly toxic gas hydrogen fluoride (hydrofluoric acid).