

## Re: Acetone + ccHCl yields chlorine?

---

*Source:* <http://sci.tech-archive.net/Archive/sci.chem/2007-10/msg00023.html>

---

- *From:* [d.086@xxxxxxxxxxxx](mailto:d.086@xxxxxxxxxxxx)
  - *Date:* Mon, 08 Oct 2007 22:23:21 -0700
- 

On Oct 8, 3:01 pm, WS <novalidaddr...@xxxxxxxxxxxxxx> wrote:

Dear Experts,

I have prepared acidic acetone by mixing 95% (v) acetone and 5% (v) conc. HCl in order to precipitate proteins from serum. After a few minutes, the solution turned yellowish green (typical chlorine color), what I didn't expect. There seems to be a weak smell of chlorine as well. When I add up to 500ul (I haven't tried more) to 50ul serum, then the green color vanishes quickly.

Can anyone explain what has happened there? acetone is 99.8% pure and pharmaceutical quality and HCl is p.a (means approx. ACS grade). I don't think acetone itself could oxidize Cl<sup>-</sup> to elementary chlorine. Could some impurities be the cause?

Thanks for your suggestions!

Wo

What you are observing is the pinacol coupling reaction of acetone. Most reactions are reversible equilibrium reactions. In your case HCl adds (reversibly) across the acetone ketone double bond to give what might be called a chlorohydrin, or specifically, 2-chloro-2-hydroxypropane. You are working in the presence of light. Bad idea. To avoid the formation of trace chlorine, you need to work in total darkness. Light induces free radical reactions that give the pinacol coupling reaction. So yes, in your case acetone is oxidizing HCl (in a reversible equilibrium sense) to give Cl<sub>2</sub> and two molecules of acetone are reduced and coupled to give pinacol. Since this is reversible, the opposite reaction occurs when excess HCl is removed by reaction with serum proteins.