

Chemical procedures for testing functional groups

<u>Chemical procedures for testing functional groups</u>			
Method:			
Procedure:	Expected observation:		
Test 1: For the first test, I added 1-2 drops of the alkene to around 2cm ³ of bromine water.	The bromine water should be decolourised. Colour change from brown to clear.		
Test 2: For the second test, I added around 2cm ³ of dilute sulfuric acid to around 2cm ³ of potassium dichromate solution. After that I added 1-2 drops of either primary/secondary alcohol or aldehyde. Then I put the test tube in the water bath for about 5-10 minutes, make sure the water bath is at an appropriate temperature.	The there should be a colour change, from orange to green.		
Test 3: For test 3, I added around 2cm ³ of Fehling's solution number 1 to around 2cm ³ of Fehling's solution number 2. After that I added 1-2 drates of aldenyde. Then I partice test table in the water bath for above 5.20 minutes, make sure the water bath is at an appropriate temperature.	appear.		
Test 4: For test 4, I added around 2cm ³ of Tollen's reagent in a test tube, and then added 1-2 drops of aldehyde. Then I put the test tube in the water bath for about 5-10 minutes, make sure the water bath is at an appropriate temperature. The Tollen's reagent is made by adding 1 drop of 0.2M NaOH to about 1cm ³ of silver nitrate solution. After this, I added dilute ammonia to – enough to dissolve the precipitate that was formed.	After doing this, a silver mirror should form.		
Test 5: For this test, I added around 1cm ³ of carboxylic acid to a test tube, I then added a spatula load of solid sodium carbonate to this .	This should result with a gas forming, bubbling through the limewater, which forms a white precipitate.		

Functional Group	Characteristic Absorption(s) (cm ⁻¹)	
Alkyl C-H Stretch	2950 - 2850 (m or s)	
Alkenyl C-H Stretch Alkenyl C=C Stretch	3100 - 3010 (m) 1680 - 1620 (v)	
Alkynyl C-H Stretch Alkynyl C≘C Stretch	~3300 (s) 2260 - 2100 (v)	
Aromatic C-H Stretch Aromatic C-H Bending Aromatic C=C Bending	~3030 (v) 860 - 680 (s) 1700 - 1500 (m,m)	
Alcohol/Phenol O-H Stretch	3550 - 3200 (broad, s)	
Carboxylic Acid O-H Stretch	3000 - 2500 (broad, v)	
Amine N-H Stretch	3500 - 3300 (m)	
Nitrile C <u>=</u> N Stretch	2260 - 2220 (m)	- uk
Aldehyde C=O Stretch Ketone C=O Stretch Ester C=O Stretch Carboxylic Acid C=O Stretch Amide C=O Stretch	1740 - 1690 (s) 1750 - 1680 (C S 1751 (S (s) 1780 - 1710 (s) 1690 - 163 ()	le.co.
Anid N-H Stretch	39 700 - 3500 (m)	

Reference: <u>http://www.chem.ucla.edu/~webspectra/irtable.html</u> This is the table I used to compare where the peaks are, to find out the functional group.

<u>Results:</u>