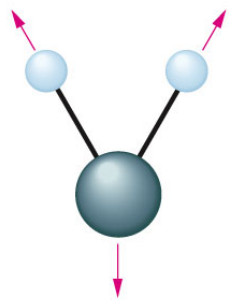


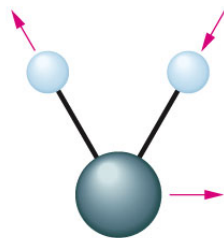
Infrared (IR) Spectroscopy

IR spectroscopy is very helpful in determining the type of bonds that are in a molecule and hence the ***functional groups***

Stretching

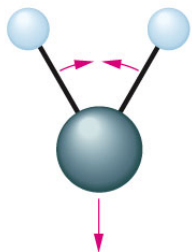


symmetric

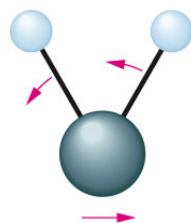


asymmetric

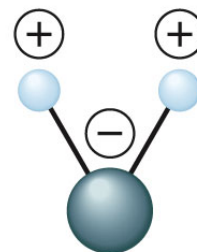
Bending



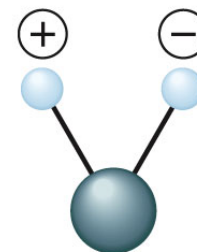
in-plane bending
or scissoring



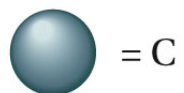
in-plane bending
or rocking



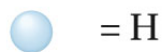
out-of-plane
bending or
wagging



out-of-plane
bending or
twisting

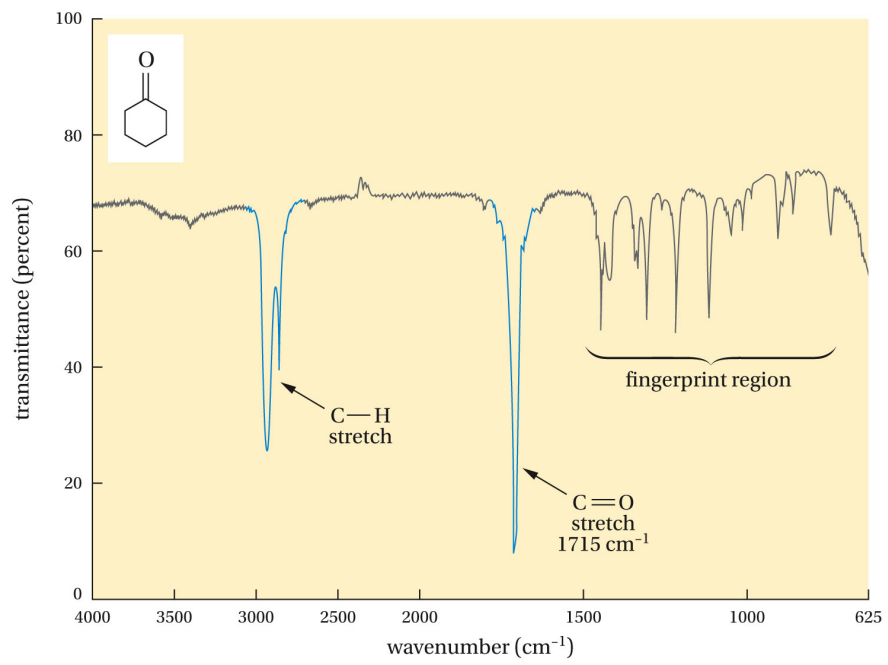
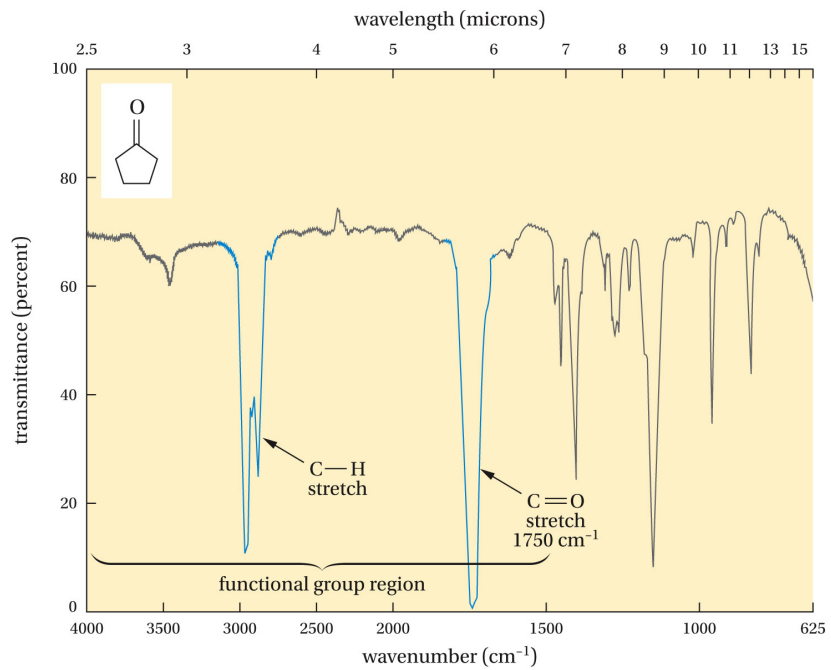


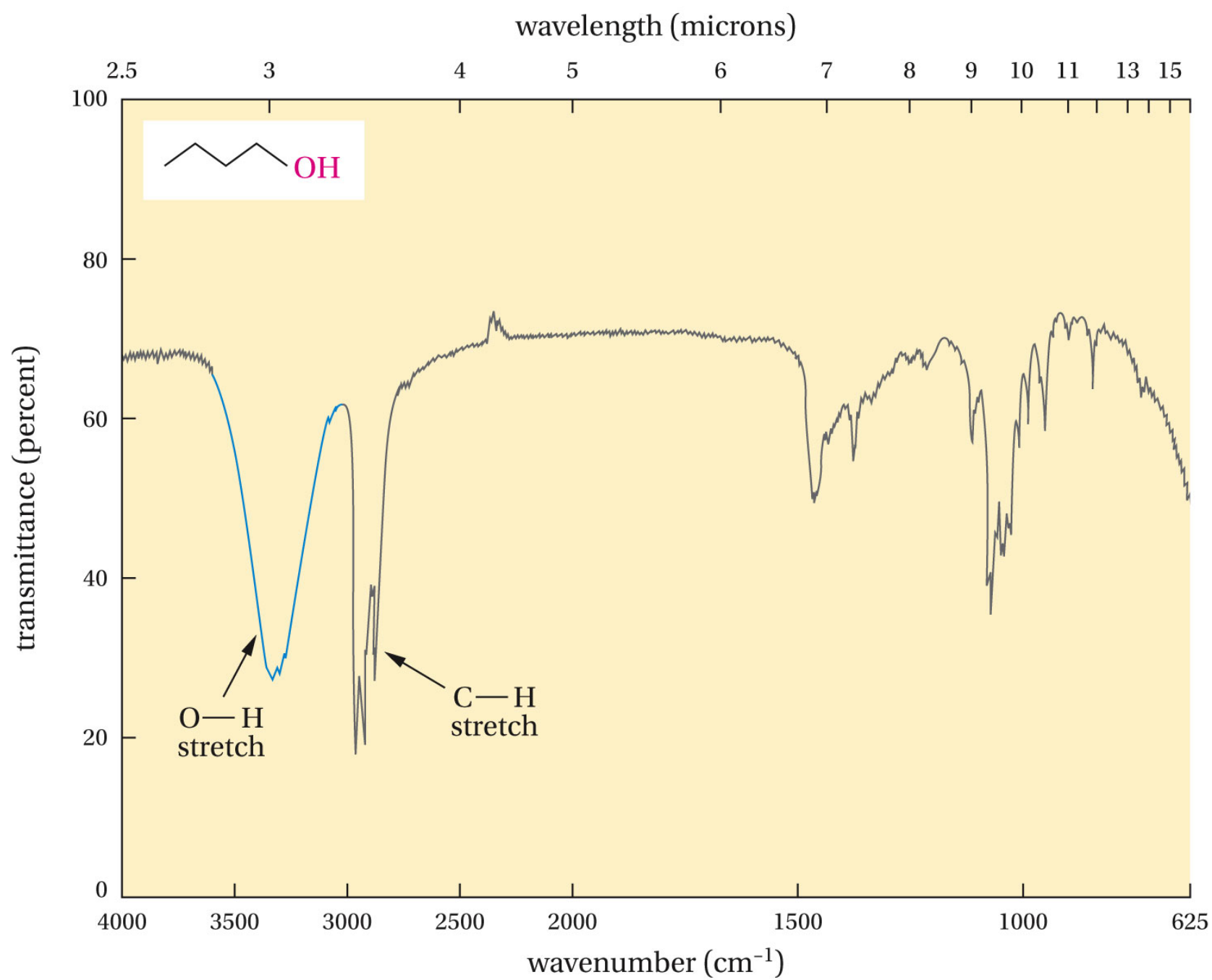
⊕ = motion toward the viewer



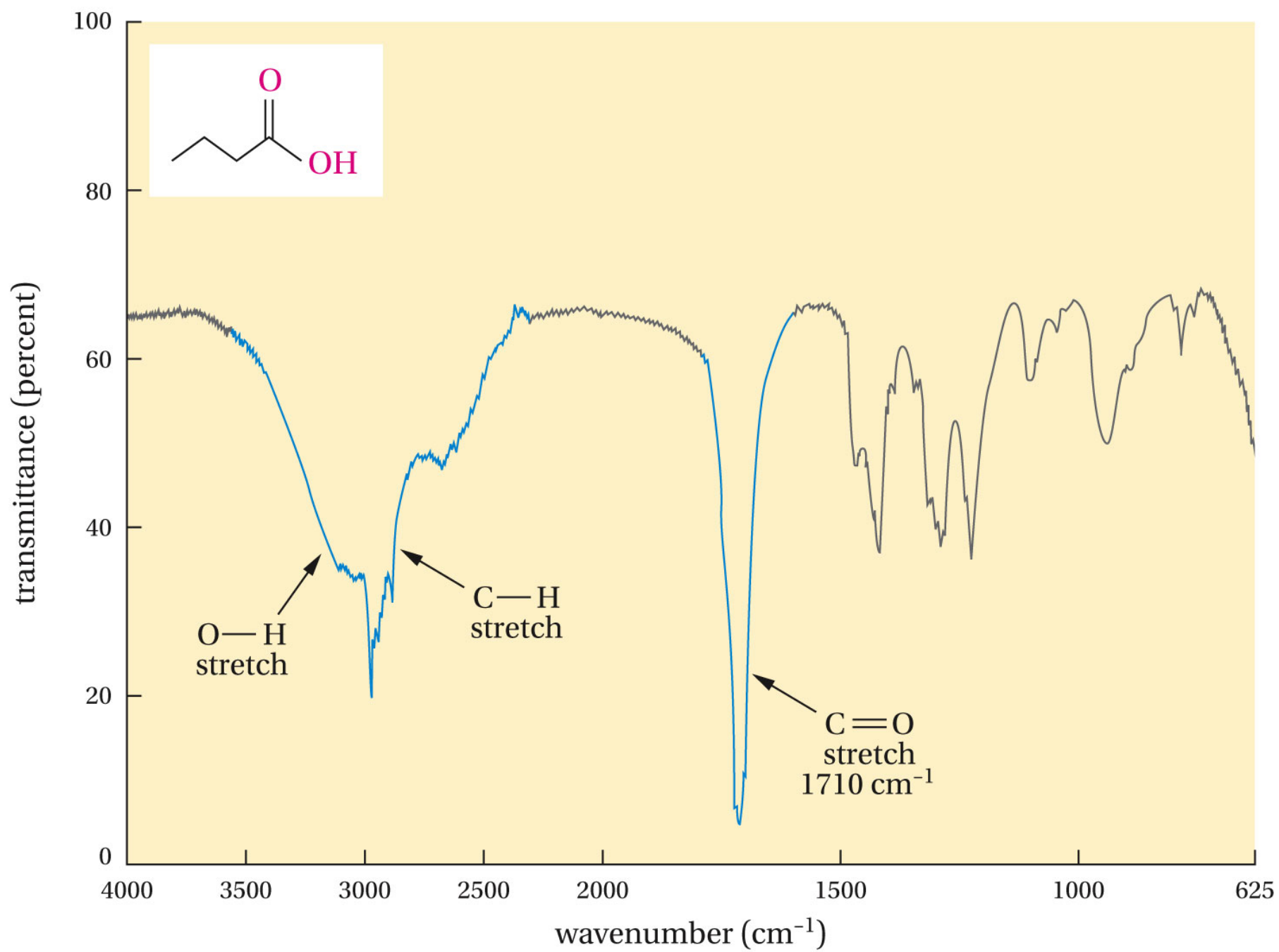
⊖ = motion away from the viewer

→
or ↘ = motion in the plane

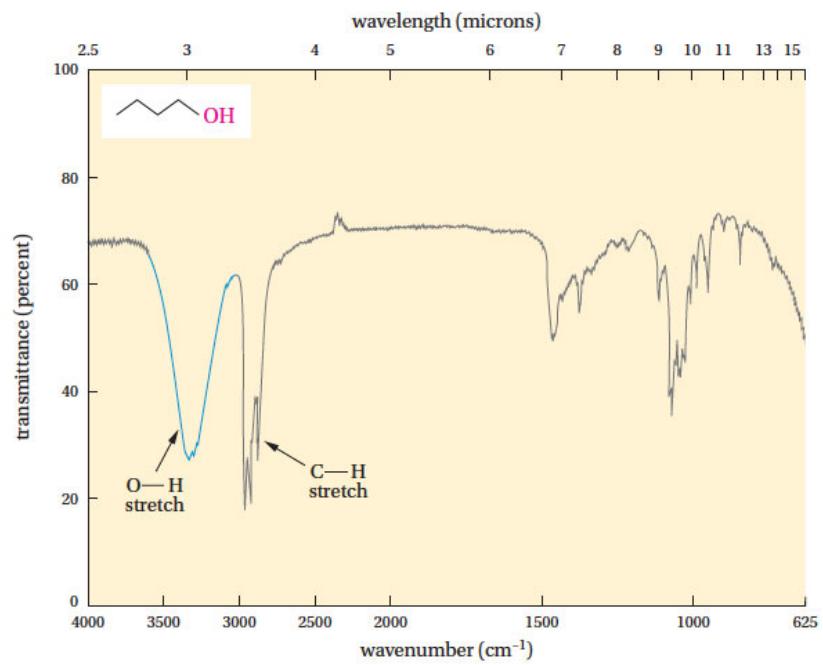




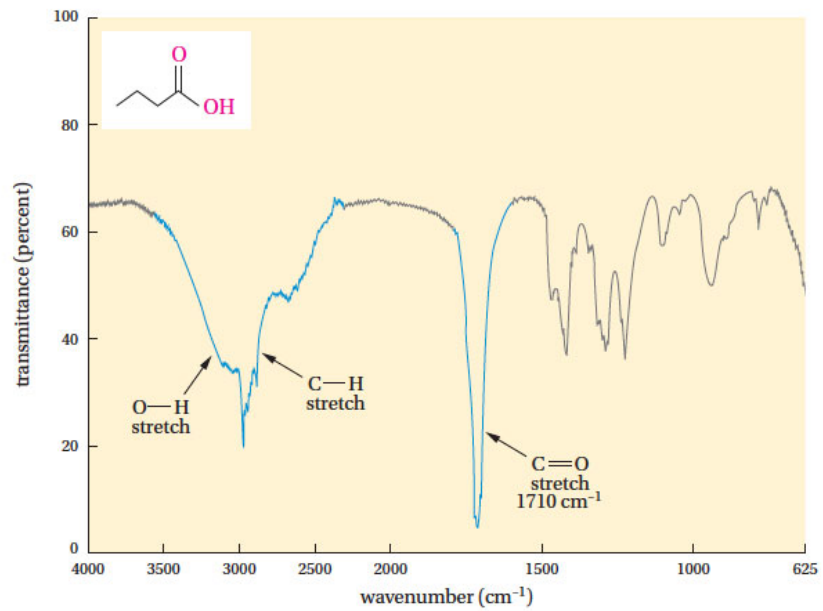
(a)



(b)

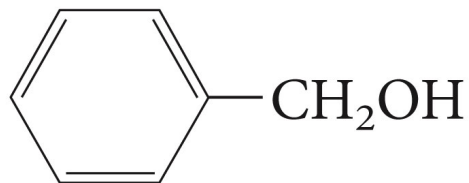


(a)

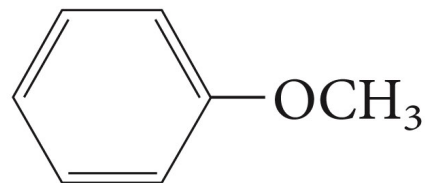


(b)

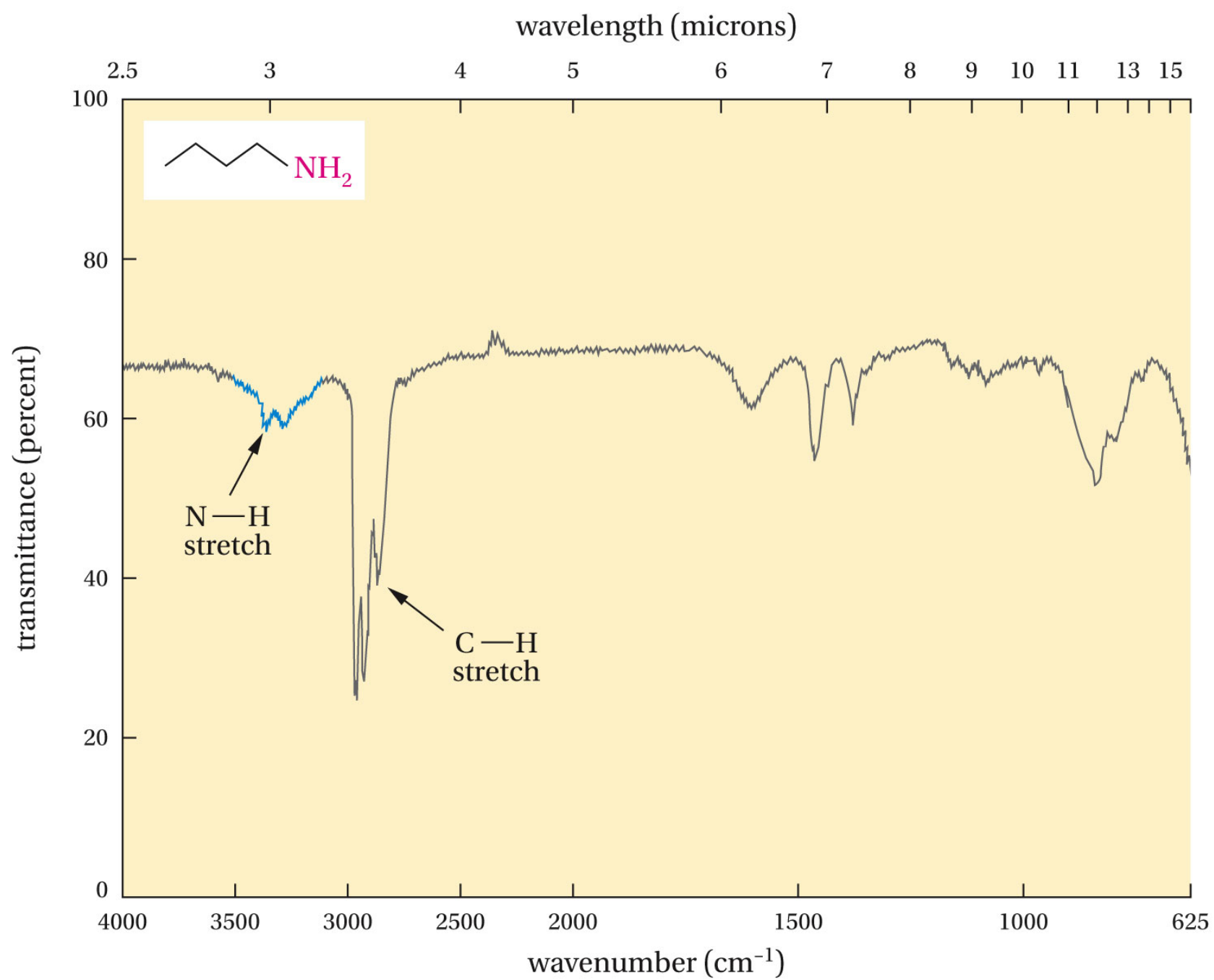
How can these isomeric compounds be distinguished using IR spectroscopy



benzyl alcohol



anisole



(c)