Lab 13B • 06/14/12

[lab exam – Merrifield resin, DCC, BOC]
[final]
[carboxylic acids & derivatives: relative reactivity of carbonyl compounds, cationic/acid vs anionic/basic mechanisms, reversibility, thermodynamically unstable acids]
[carboxylic acid & derivative reactions: esterification, hydrolysis, saponification, diazomethane, solvolysis, alkylation, reduction, reducing agents, transesterification]
[enolates: pKa values, cationic vs anionic mechanisms, alpha-halogenation, haloform, aldol, Claisen, Dieckmann, Michael, Robinson annulation, Stork enamine, alkylation, maloinc ester synthesis]
[amine synthesis: Sn2, reduction of alkyl azides, hydrogenation of nitriles, reduction of amides, reduction of imines, reductive amination, Gabriel synthesis, reduction of nitro compounds, Curtius and Hofmann rearrangements]
[amine and amine reactions: acid/base properties, Hofmann elimination]
[carbohydrates: Fischer proof]
[amino acids: phthalimidomalonic ester synthesis]

l-Alanine has three forms. You quoted two pKa values, one of which was 2.34, one of which was 9.69. These halves that I'm writing here refer to the fact that at pH of 2.34, half of amino acid would be in its cationic form, half would be in its zwitterionic form, and at 9.69, half of it would be in its zwitterionic form, half of it would be in its anionic form. At pH 10, what is the predominant form of l-alanine? Is it completely in its anionic form? What if I had a pH of 6.2? The pI of this compound is 6.02, the average of the only two pKa values. If I was at a pH of 6.2, not 6.02, what would I have in solution? More anionic than cationic, but effectively neutral, because the majority of it would be neutral. Does an amino acid have to be converted into 100% into a cationic or anionic form in order to perform electrophoresis? [No]

Until it leaves the column, you cannot add ninhydrin, because the only reason that compounds get separated on the column is because of their differential behavior towards the ion-exchange material. Ninhydrin removes the difference between the different amino acids, because it makes the same complex with whatever amino acid you throw at it. If the whole point of chromatography is to separate compounds, but you've made them all equal, it won't work, so you have to wait until after the material comes off the column, then you can use ninhydrin.

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