

Answer on Question #63857 - Chemistry – Inorganic Chemistry

Of the species listed below, select those less basic than acetylide (only one option permitted).

- a. BuLi
- b. NaNH₂
- c. NaOCH₃
- d. both BuLi and NaOCH₃
- e. both NaNH₂ and NaOCH₃

Give a explanation please

Solution.

The weaker the acid, the stronger the conjugate base

BuLi – a strong base (superbase), because butane has a $pK_a = 60$ and conjugate base – butyl carbanion ($CH_3CH_2CH_2CH_2^-$) has a $pK_b = pK_w - pK_a = -46$

NaNH₂: NH₂⁻ anion is the conjugate base of ammonia (NH₃). Since NH₃ has a $pK_a = 35$, NH₂ is a strong base ($pK_b = -21$)

CH₃O⁻ anion is the conjugate base of methanol (CH₃OH). $pK_a(CH_3OH) = 15$ and $pK_b(CH_3O^-) = -1$

Acetylide C₂H⁻ has $pK_b = -11$ ($pK_a = 25$)

The correct answer: c. NaOCH₃

Answer: c. NaOCH₃