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五硼酸钾、偏硼酸钾和四硼酸钾溶液中硼酸根离子类型、密度及电导率研究

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摘　要:利用牛顿迭代方法计算给出硼酸钾溶液中硼酸根离子的物种分布图。研究给出溶液中硼酸根离子的类型、含量以及各硼酸根离子间相互转化方程式,并简单谈论了温度和浓度对硼酸根离子类型和含量的影响。在五硼酸钾溶液中主要硼酸根离子物种为 $B_3O_3(OH)_4^-$, $B_4O_5(OH)_4^{2-}$ 和 $B(OH)_3$,而 $B_5O_6(OH)_4^-$ 含量非常低,可以忽略不计;偏硼酸钾溶液中主要离子为 $B(OH)_4^-$;在高浓四硼酸钾溶液中主要物种为 $B_3O_3(OH)_4^-$, $B_4O_5(OH)_4^{2-}$ 和 $B(OH)_4^-$。最后用 Otakar 和 Casteel-Amis 经验方程式分别研究了硼酸钾溶液的密度和电导率。

关键词:溶液结构;硼酸钾;硼酸根离子;电导率