

# Comparing and Analyzing Six Metal Ion Nitrates' Ability to Behave as Lewis Acids and What Causes This Behavior

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In this study, six metal ion nitrate solutions at 0.1M were prepared and the pH level of each was measured to observe their ability to behave as Lewis acids and to discover what causes this behavior. Taking into account their differing molar masses, calculations were made prior to the experiment to deduce the mass of each nitrate needed to produce a 0.1M solution. The pH levels of the nitrate solutions were measured and compared. The cause of the magnitude at which the pH levels differed across the nitrates was found to be due to the effect charge, ionic radius, and electronegativity have on the pH level of complex ions. Listed from most acidic to least acidic, the result of the experiment is as follows:  $\text{Fe}(\text{NO}_3)_3$  ,  $\text{Al}(\text{NO}_3)_3$  ,  $\text{Ca}(\text{NO}_3)_2$  ,  $\text{Ni}(\text{NO}_3)_2$  ,  $\text{Co}(\text{NO}_3)_2$  ,  $\text{Zn}(\text{NO}_3)_2$  .