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Purity Determination and Uncertainty Evaluation of Acrylonitrile by Gas Chromatography and Differential Scanning Calorimetry

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Abstract: Methods of gas chromatography and differential scanning calorimetry (DSC) were used to determine the purity of acrylonitrile. In the method of gas chromatography, the organic impurities were determined using benzene as external standard, the contents of moisture were determined using the Karl Fisher method, and the inorganic elements were determined using ICP-MS method. The purity determined using gas chromatography was 99.32% (g/g) with an extended uncertainty of 0.42% (k=2), and that determined using DSC method was 98.88% (g/g) with an extended uncertainty of 1.07% (k=2). The uncertainty evaluation of purity demonstrated that the accuracy of the gas chromatography method is better than that of DSC method.

Keywords: Gas chromatography; Uncertainty; Purity; Differential scanning calorimetry; Acrylonitrile