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A direct method of quantification of maximal chemisorption of 3-aminopropylsilyl groups on silica gel using DRIFT spectroscopy

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Abstract

3-aminopropylsilyl (APS) modified silica gel plays an important role as a precursor for further modifications, where APS acts as a spacer or bridging molecule. A monolayer of APS which is most suitable for this purpose was obtained in anhydrous conditions. The properties of the APS-modified silica gel depend on the amount of molecules chemisorbed on the surface. A direct quantitative method using Diffuse Reflectance Infrared Fourier Transform (DRIFT) spectroscopy was proposed. The obtained results were further supported with the results by elemental analysis. The conclusion was that the proposed methodology can be used for the quantification of APS groups chemisorbed on silica gel when the grafting chemical reaction was mainly irreversible.

Key words: 3-aminopropyltrimethoxysilane (APTMS); Silica gel; DRIFT; Chemisorption; Quantification; Modified silica gel.

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