

Tetraethylene oxide-bonded Stationary Phase for Separation of Inorganic Anions and Polar Compounds in Capillary Liquid Chromatography

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In most cases in ion chromatography (IC), ions are separated based on the difference in electrostatic attraction or repulsion between analytes and the stationary phase. Therefore, the stationary phase employed for IC has functional groups with charged or chargeable moieties. Beside various ion exchangers, inorganic anions could also be separated even if the stationary phase possesses no ion exchange site [1-3].

The shorter chain of ethylene oxide; tetraethylene glycol monomethyl ether (TEGMM) or tetraethylene glycol (TEG) modified silica was synthesized and investigated as the stationary phase for IC. The tetraethylene oxide bonded stationary phase was prepared by chemically bonding of TEGMM and TEG on silica *via* reaction with 3-glycidyloxypropyltrimethoxysilane. The present stationary phases were successfully used as the stationary phase for separation of inorganic anions. The retention of inorganic anions could be manipulated by ion exchange interaction although the prepared stationary phase has no ion-exchange sites. It is expected that the eluent cation is coordinated among the chains of ethylene oxide and it works as the anion-exchange site. We demonstrated that the retention of the analyte anions decreased with increasing eluent concentration. The TEG bonded stationary phase has better selectivity and stronger retention for 5 selected anions, compared with the TEGMM bonded stationary phase. Both of the present ethylene oxide bonded stationary phases could not separate bromide and nitrate, unfortunately. The elution order of the tested anions was similar as observed in common IC; iodate, bromate, bromide and nitrate, iodide, and thiocyanate. It was also found that the TEG bonded stationary phase has hydrophilic property, due to the hydroxyl group on the end of TEG chains. The TEG bonded stationary phase was successfully used for separation of phenol compounds.

[1] J. D. Lamb and R. G. Smith, *J. Chromatogr. A*, 546, (1991), 73.

[2] J. D. Lamb, R. G. Smith, and J. Jagodzinski, *J. Chromatogr. A*, 640, (1993), 33

[3] T. Takeuchi and L. W. Lim, *Anal. Sci.*, 26, (2010), 937.



Certificate of Participation

This is to certify that:

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*has participate in the 2013 APCE & KSFEA & APIA Bioanalytical and
Environmental Applications Conference
held in Jeju island, Korea, 3th-6th of November2013.*

APCE3
2013