DETERMINATION OF ACRYLATES/ METHACRYLATES VIA DYNAMIC HEADSPACE OUTGASSING PROCEDURE

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ABSTRACT

Dynamic headspace/ GCMS method was applied to study the compounds outgassed from hard disk drive spindle motors. A non-equilibrium dynamic headspace sampling technique was applied where samples were heated at 85 ^{o}C and their outgassed compounds were purged to an adsorbent by flow of nitrogen gas (99.99% purity) set at 65 ml/min for 3 hours.

Desorption of compounds was done by using a thermal desorption system and analyzed via GCMS. Semi quantitative analysis method was carried out with reference to 1000 ng deuterated hexadecane-d34. The major groups of compounds detected in the analysis were the acrylates/ methacrylates, alcohol and hydrocarbons.

A full quantitative method was established for 3 common compounds, i.e. 2-hydroxyethyl methacrylate, tetrahydrofurfuryl acrylate and isobornyl methacrylate. Both semi quantitative and full quantitative methods were compared.

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LIST OF ABBREVIATION

CIS	-	Cold Injection System
DHS	-	Dynamic Headspace
DI	-	Deionized
DOP	-	Dioctyl Phtalate
EGDM	-	Ethylene glycol dimethacrylate
EM	-	Electron Multiplier (EM)
ESCA	-	Electron Spectroscopy for Chemical Analysis
FTIR	-	Fourier Transform Infra Red Spectrometer
GC	-	Gas Chromatography
GCMS	-	Gas Chromatography Mass Spectrometer
HDD	-	Hard Disk Drive
HDI	-	Head Disk Interface
HEA	-	2-hydroxyethyl acrylate
HED	-	High-energy dynode
HEMA	-	2-hydroxyethyl methacrylate
HPM	-	2-hydroxypropyl methacrylate
HSA	-	Headstack Assembly
IBM	-	Isobornyl Methacrylate
IDEMA	-	International Disk Drive Equipment and Material Association
LPC	-	Liquid Particle Counter
MSD	-	Mass Spectrometer Detector
PDMS	-	Polydimethyl siloxane
PSA	-	Pressure Sensitive Adhesives
Rt	-	Retention Time

SEM-EDS	-	Scanning Electron Microscope/Energy Dispersion X-Ray Spectrometer
SHS	-	Static Headspace
TDS	-	Thermal Desorption System
THFA	-	Tetrahydrofurfuryl acrylate
TOF-SIMS	-	Time of Flight-Secondary Ion Mass Spectrometry
UV	-	Ultraviolet

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