Analysis of Organic Additives in CMP Slurry

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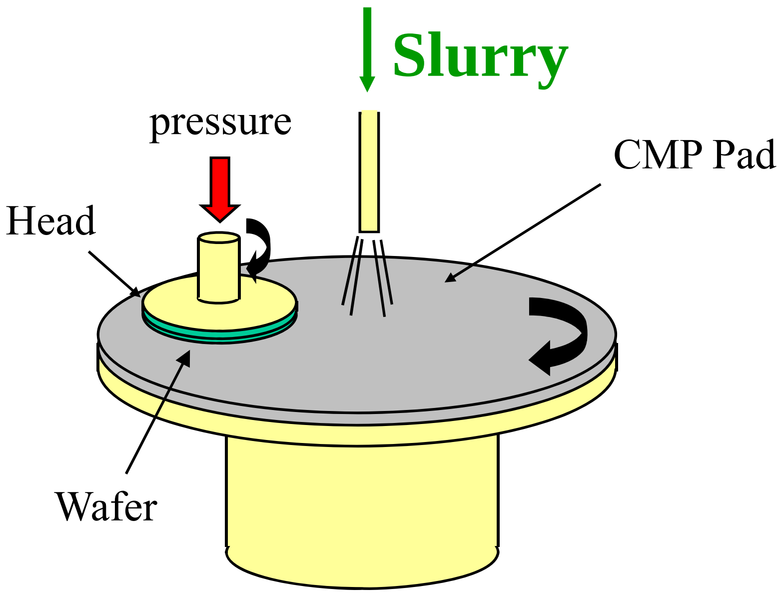
Organic Analysis Laboratory

CMP Slurry

CMP＝Chemical Mechanical Polishing



Chemical ←Additives

Mechanical ←Particles, Pad

＜Typical Composition of Slurry＞

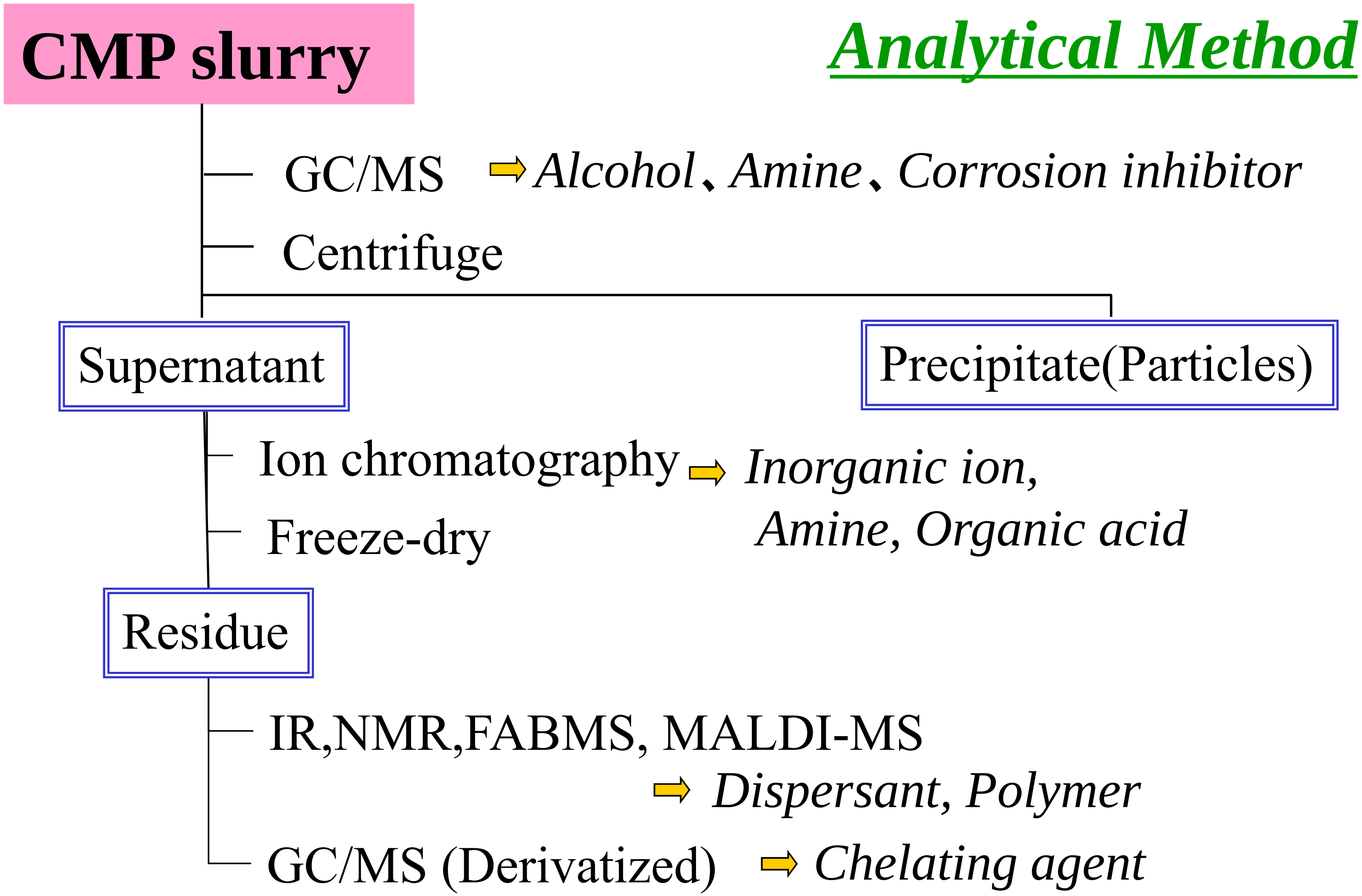
Particles

Silica, Almina, Ceria etc.

Additives

- Dispersant ： Polyethylene glycol(PEG) etc.
- Chelating Agent ：
  Lactic acd, Quinaldinic acid
- Corrosion Inhibitor ：Benzotriazole
- Alcohol ：Isopropanol
- pH conditioner ：
  Inoraganic acid ,Ammonium etc.
- Oxdizing Agent ：H_2O_2

Composition analysis of CMP slurry

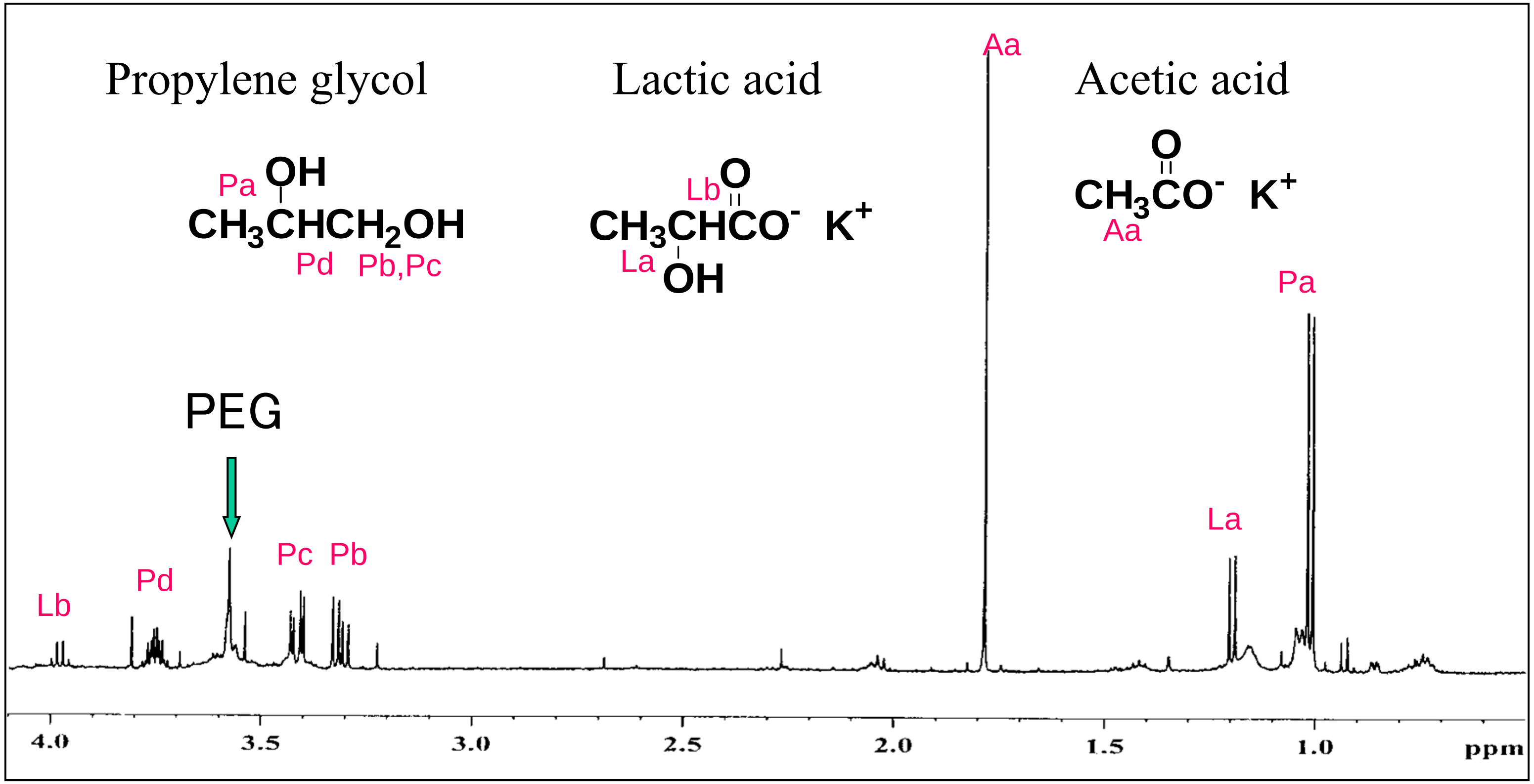


CMP slurry

Analytical Method

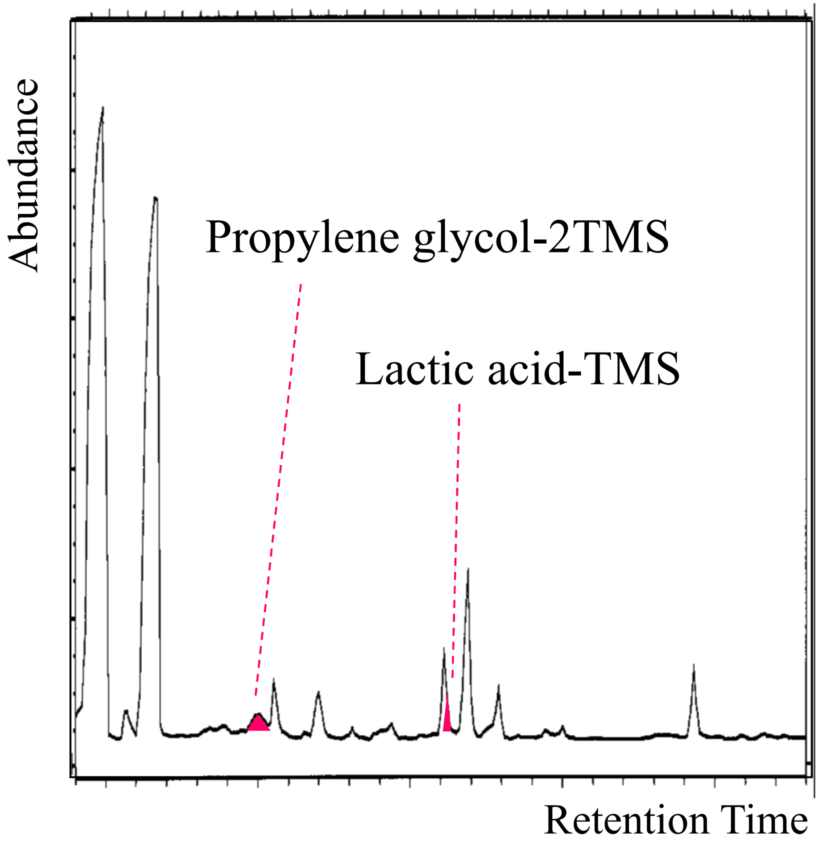
- GC/MS ⇨ *Alcohol、Amine、Corrosion inhibitor*
- Centrifuge
  - Supernatant
    - Ion chromatography ⇨ *Inorganic ion, Amine, Organic acid*
    - Freeze-dry
      - Residue
        - IR,NMR,FABMS, MALDI-MS ⇨ *Dispersant, Polymer*
        - GC/MS (Derivatized) ⇨ *Chelating agent*
  - Precipitate(Particles)

^{1}H-NMR spectrum of Additives in Residue

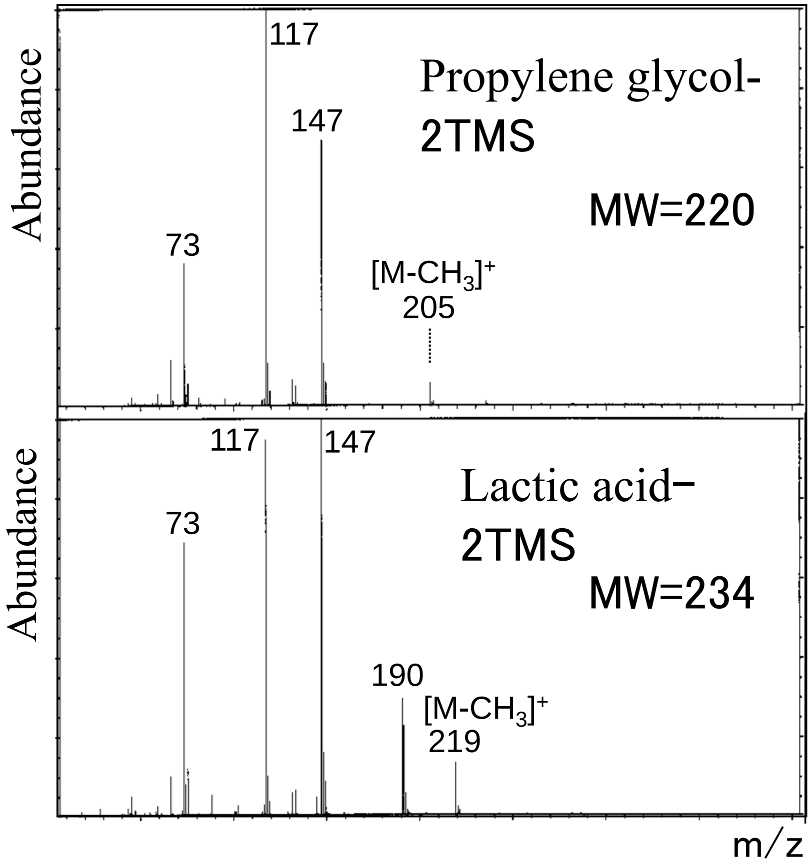


Trace amount of dispersant and chelating agent were detected from the 1H-NMR spectrum.

GC/MS analysis of Derivatized Additives in Residue



Total Ion Chromatogram



Mass Spectra

Polar compounds such as the chelating agents were determined by GC/MS analysis of Trimethylsilyl(TMS) derivatives of residue.