$GaPO_4$ - Crystals

Media compatibility

CHEMICAL RESISTANCE OF $GaPO_4$ IN LIQUIDS

To test the resistance of $GaPO_4$ crystals to chemical attack by acids, bases and other liquid solutions, small $GaPO_4$ platelets were treated in stirred liquids at room temperature (except when other temperature is given). The mass loss and occurrence of etching patterns after treatment are listed.

solute/liquid	pH	duration	mass loss	etching patterns
KOH 6 M		24h	very strong	strong
KOH 0.1M	13	24h	weak	strong
NH_4OH 6 M		24h	no	weak
NH_4OH 0.1M	11	24h	weak	weak
NaOH 6 M		24h	very strong	strong
NaOH 1 M	14	24h	very strong	strong
NaOH 0.1M	13	24h	strong	strong
NaOH 0.003 M	11.5	24h	weak	strong
NaOH 0.0001 M	10	24h	weak	weak
NaOH 0.00003 M	9.5	24h	very weak	weak
NaOH	9	120h	very weak	weak
NaOH	8	120h	no	no
sawing liquid Syntilo R	9	24h	no	weak
Buffer solution	7	120h	no	no
H_3PO_4 85%		24h	weak	strong
H_3PO_4 50%		24h	weak	strong
H_2SO_4 95%		24h	no	no
H_2SO_4 25%		24h	weak	strong
CH_3COOH	2	24h	weak	weak
CH_3COOH	3	120h	no	very weak
CH_3COOH	4	120h	no	no
CH_3COOH	5	120h	no	no
HCl	1	120h	strong	strong
HCl	2	24h	weak	weak
HCl	3	120h	no	very weak
HCl	4	120h	no	no
HCl	5	120h	no	no
HCl, T = 80 °C	3	120h	no	very weak

Conclusion:

$GaPO_4$ is stable in aqueous solutions in the pH range 3 to 8.5. Outside this range, it is etched, except by concentrated H_2SO_4.
Tests in organic solvents, such as ethanol, isopropanol, acetone, ethyl-methyl ketone, and dimethylformamide, show no sign of etching; $GaPO_4$ is fully stable against them.

We recommend the use of organic solvents for cleaning such as acetone, alcohols or dimethylformamide. If possible clean at elevated temperatures (up to the boiling point of the solvent you use), by stirring the solvent or in an ultrasonic bath.

Do not use acid or basic solutions, since etching of the material cannot be excluded. An exception is concentrated sulfuric acid (H_2SO_4, min. 95 %), which can be used to remove very persistent contaminations. Duration of treatment: approx. 5 minutes, temperature: up to 50 °C. Always use fresh solvent, because H_2SO_4 acid is a hygroscopical liquid and may etch $GaPO_4$ when it absorbs water.

Ammonia in liquid or in vapour form is not suitable for cleaning, because of the risk of etching.