



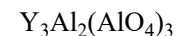
>>Entry Name: Aluminium yttrium oxide (Al₅Y₃O₁₂)

Synonym(s): Pentaaluminium triyttrium dodecaoxide. Yttrium aluminium garnet. YAG

CAS Registry Number: 12005-21-9

Related CAS Registry Numbers(s): 12003-86-0 12043-20-8 88506-07-4

Extra CAS Registry Numbers(s): 37243-54-2



Molecular Formula: Al₅O₁₂Y₃

Molecular Weight: 593.618

Accurate Mass: 593.564222

Percentage Composition: Al 22.73%; O 32.34%; Y 44.93%

General Statement: Cubic garnet struct.

Source/Synthesis: Obt. from the melted oxide or hydrothermal synth. from Y₂O₃, Al₂O₃, in 6*M* aq. K₂CO₃. Alternative low-temp. synth involves reaction of Al(NO₃)₃ + Y(NO₃)₃ + citric acid at 80° (citrate gel process); significantly lower temp. employed than other conventional methods, e.g. 1600°

Use/Importance: Laser host material. When Ce³⁽⁺⁾-activated, used in flying-spot scanner for colour TV signals. Nd³⁽⁺⁾ doped for laser applications. Used to make artificial diamonds. Eu³⁽⁺⁾/Tb³⁽⁺⁾ doped material used as phosphors in high-resolution display devices; Sm³⁽⁺⁾ doped material has potential use in pressure-sensitive sensors

Physical Description: Colourless cryst. (melt)

Melting Point: Mp 1980° (1970°)

Other Data: Several related phases descr. *n*_D 1.835. Gd analogue also descr. Y₄Al₂O₉, YAlO₃ also descr.. High-purity polycrystalline (particle size 20-70 nm) material obt. by low-temp citrate gel process

>>Variant: YAlO₃

Synonym(s): Aluminium yttrium oxide (AlYO₃)

Molecular Formula: AlO₃Y

Molecular Weight: 163.886

Accurate Mass: 163.872133

Percentage Composition: Al 16.46%; O 29.29%; Y 54.25%

Source/Synthesis: Material synth. by MOCVD of Y(dpm)₃ and Al(acac)₃ on single cryst. (110) LaAlO₃ substrate at 800° is an insulator in high-temp. superconducting devices

References:

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