



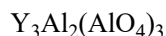
>>Entry Name: Aluminium yttrium oxide ($\text{Al}_5\text{Y}_3\text{O}_{12}$)

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: $\text{Al}_5\text{O}_{12}\text{Y}_3$

Molecular Weight: 593.618

Accurate Mass: 593.564222

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

Source/Synthesis: Obt. from the melted oxide or hydrothermal synth. from Y_2O_3 , Al_2O_3 , in 6M aq. K_2CO_3 .

Alternative low-temp. synth involves reaction of $\text{Al}(\text{NO}_3)_3 + \text{Y}(\text{NO}_3)_3 + \text{citric acid}$ at 80° (citrate gel process); significantly lower temp. employed than other conventional methods, e.g. 1600°

Use/Importance: Laser host material. When Ce^{3+} -activated, used in flying-spot scanner for colour TV signals. Nd^{3+} doped for laser applications. Used to make artificial diamonds. $\text{Eu}^{3+}/\text{Tb}^{3+}$ doped material used as phosphors in high-resolution display devices; Sm^{3+} 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. $\text{Y}_4\text{Al}_2\text{O}_9$, YAlO_3 also descr.. High-purity polycrystalline (particle size 20-70 nm) material obt. by low-temp citrate gel process

>>Variant: YAlO_3

Synonym(s): Aluminium yttrium oxide (AlYO_3)

Molecular Formula: AlO_3Y

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 $\text{Y}(\text{dpm})_3$ and $\text{Al}(\text{acac})_3$ on single cryst. (110) LaAlO_3 substrate at 800° is an insulator in high-temp. superconducting devices

References: