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GAGG
(Gadolinium Aluminium Gallium Garnet)

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This is a cerium-doped Gadolinium Aluminium Gallium Garnet (GAGG) – a relative of the GGG that was used as a diamond simulant in the 1960s and 70s (before the introduction of Cubic Zirconia). With the addition of aluminium, GAGG is significantly harder than GGG, though has a lower refractive index (of 1.90 rather than 1.97).

This material was developed for use as a scintillator in medical imaging equipment; meaning it fluoresces when exposed to ionising radiation (gamma rays & X-rays). It also fluoresces under lower-energy ultraviolet and blue light. By varying the concentration of cerium, the garnet can be tuned towards greater fluorescence or faster decay times. The specimen pictured contains so much cerium that it phosphoresces for around an hour (thus glowing in the dark)!

A phosphorescing cerium-doped GAGG (without external lighting)

Cerium-doped GAGG and other “lumogarnets” were introduced to the jewellery trade by Timothy and Stephen Challener in 2022. These are among a new generation of manufactured gemstones that are unconstrained by the properties of natural stones. The fluorescence of the “lumogarnets” sits alongside the incredible colour-change of Nd- & Pr-doped glass, and the spectacular dispersion of rutile – with each stone offering a visual impact unmatched by conventional jewellery.