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The development and performance of 1D lead-free Rb-based metal halide scintillators.

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The ability to detect ionising radiation is crucial to many areas of modern-day life spanning use in medical imaging, cancer therapies, security, and environmental monitoring as well as potential in military field applications. Indirect detectors, also known as scintillators, operate by absorbing high energy X-rays then converting into lower energy photons that emit in the UV/Visible region. The development of ideal photoactive materials for low-cost scintillator fabrication has recently seen a focus towards lead-free metal halides, known for their characteristic broadband emission, large Stoke shifts, nanosecond decay lifetimes and ease of processability. Here we present our latest results on Rb2AgX3, X = Cl, Br, which show broadband emission centred at 515 nm and 580 nm, respectively. These Rb-based materials also possess fast radiative recombination from self-trapped excitons with typical decay times of 10 ns. The performance of the Br and Cl scintillator materials and their suitability for X-ray imaging applications will be compared.

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