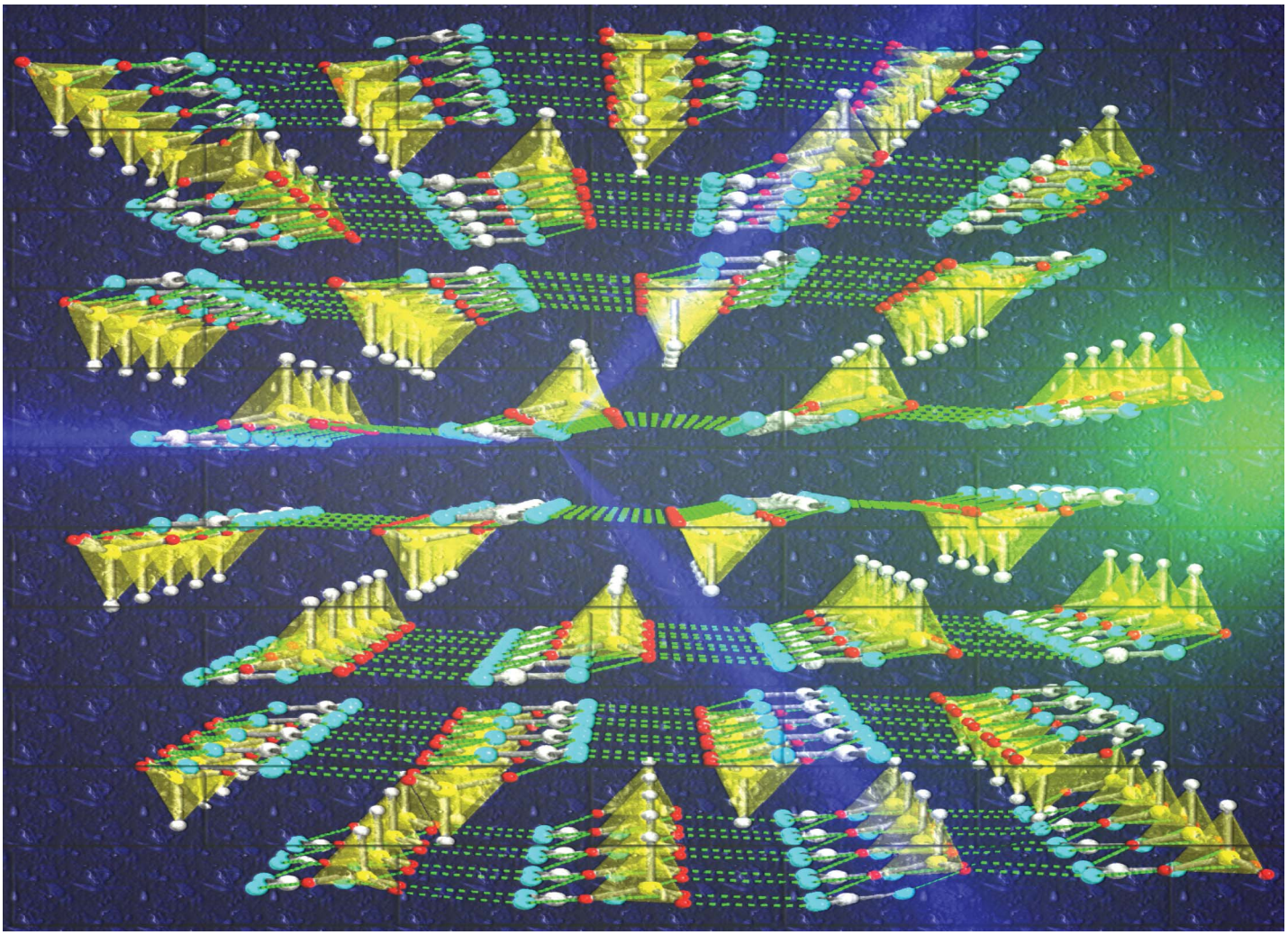

Showcasing research from Professor Ok's laboratory, Department of Chemistry, Sogang University, Seoul, Republic of Korea.

Strategically designed metal-free deep-ultraviolet birefringent crystals with superior optical properties

Discovering new birefringent materials with deep-ultraviolet (DUV, λ < 200 nm) transparency is crucial, due to growing application demands. This study presents three guanidinium-based compounds, $C(NH_2)_3CH_3SO_3$, β-$C(NH_2)_3Cl$, and γ-$C(NH_2)_3Cl$, featuring $[C(NH_2)_3{\cdot}X]_\infty$ pseudo layers. Theoretical calculations reveal that these metal-free compounds have broad bandgaps (6.49-6.71 eV) and high birefringence (0.166-0.211@1064 nm). Centimeter-sized $C(NH_2)_3CH_3SO_3$ crystals were grown *via* an aqua-solution method, while β/γ-$C(NH_2)_3Cl$ was optimized, leading to NH_2COF with a wider bandgap (7.87 eV) and giant birefringence (0.241@1064 nm). This work provides insights into the design of DUV birefringent crystals.

As featured in:

See Xinglong Chen, Kang Min Ok *et al.*, *Chem. Sci.*, 2024, **15**, 15145.

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