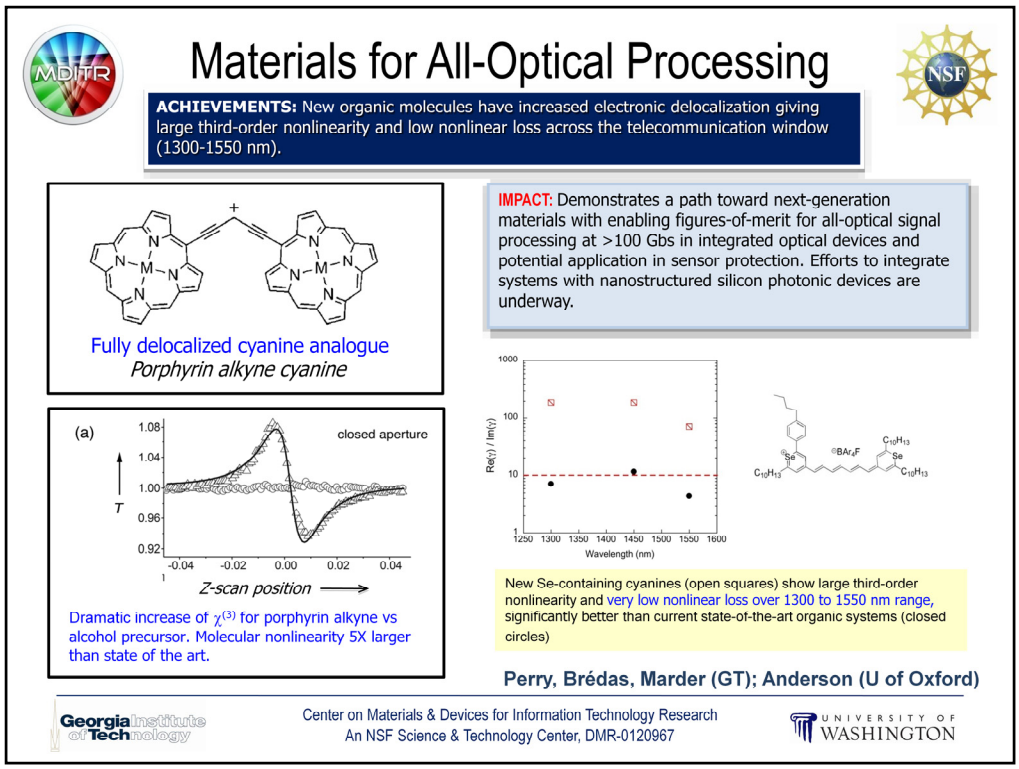

IMPACT: The compounds described have extremely large third-order optical nonlinearities. In both cases (the porphyrin and selenopyrylium cyanines), the ratio of the real to imaginary part of the nonlinearity is extremely high, which is critical for their applicability to all-optical switching applications.

DISCUSSION: High nonlinearities are required for all optical switching applications, so adequate changes in the refractive index of the materials can be achieved with reasonable optical input power. However, at the same time all sources of loss must be kept low so that light can travel through the device. In the case of all-optical switching, in addition to linear loss and scattering losses it is critical to minimize nonlinear optical losses, because of the high fluences required to induce the index change. The imaginary part of $\chi^{(3)}$ is related to the two-photon absorption cross section which must be minimized to reduce the nonlinear loss. Thus, the porphyrin and selenopyrylium cyanine compounds developed within CMDITR have state-of-the-art high figures of merit for all-optical switching applications.

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