



EIGENCHEM TECHNOLOGIES INC.

Alexander Oliferenko

President & Chief Science Officer

Pipeline of Innovative Materials:
Telecom, Healthcare, and Agriculture

10th RASA Conference, November 8-10, Clearwater, FL



COMPANY

EigenChem Technologies Inc.
12085 Research Drive, Suite 141
Alachua, FL 32615

Formed on April 08, 2011

Based in Sid Martin BioIncubator, University of Florida



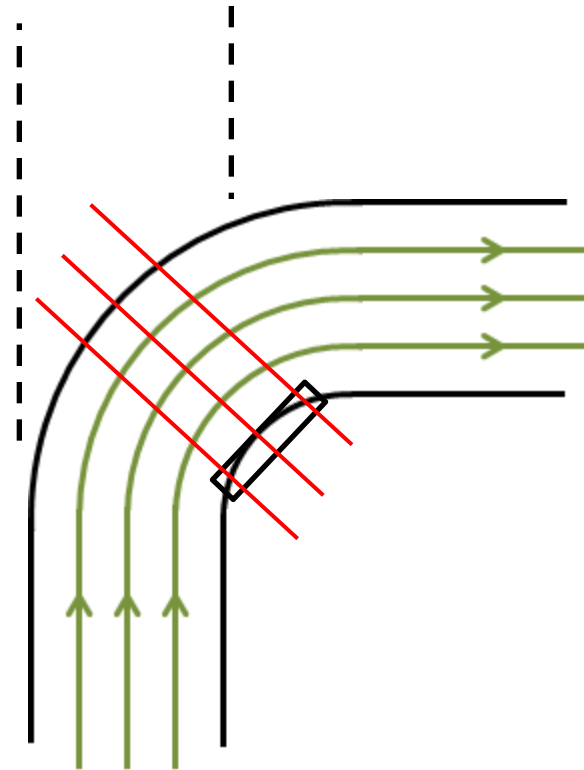
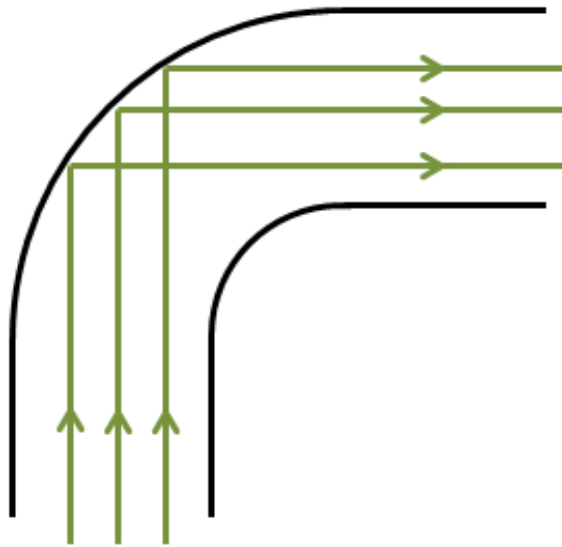
Applications of nonlinear optical materials (NLO):

- telecommunications: all-optical switch
- laser technology: optical power limiting
- life sciences: bioimaging and optofluidics

Problem of existing chromophores

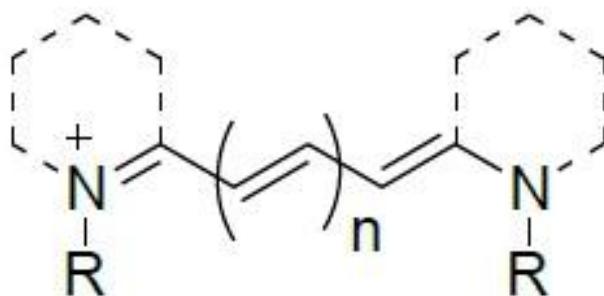
- aggregation in solutions
- low number density if in polymer matrix
- scattering in solid state
- long response times

All-optical signal processing: controlling light by light



Design criteria

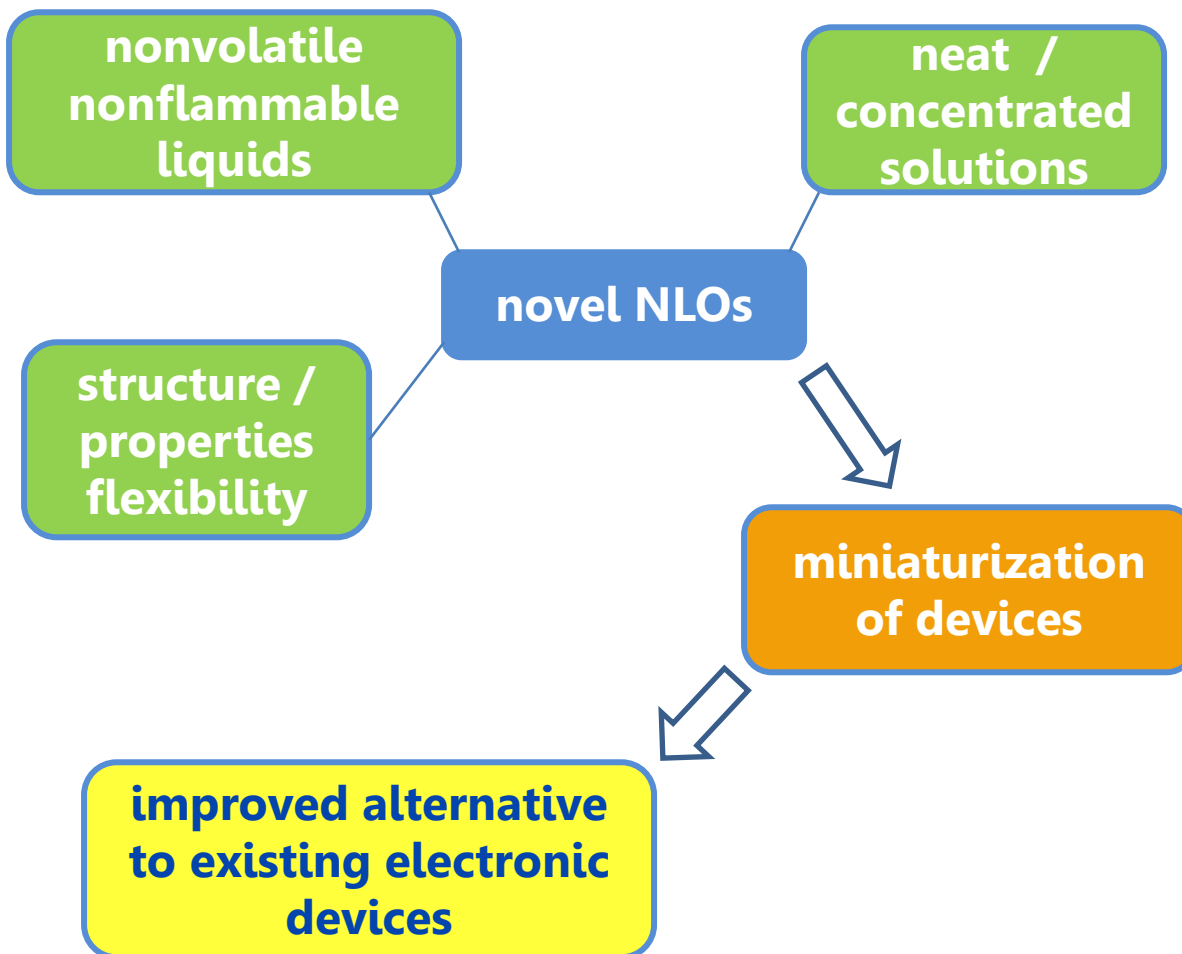
- Effective conjugation length
- Quinoidicity vs. aromaticity
- Molecular asymmetry
- Highly polarizable atoms



Generic structure of polymethine cyanine

NONLINEAR OPTICAL MATERIALS

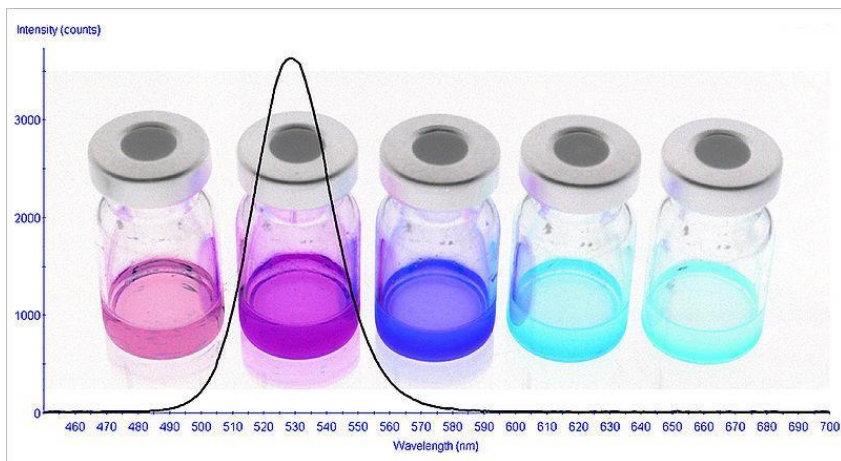
Our innovative solution



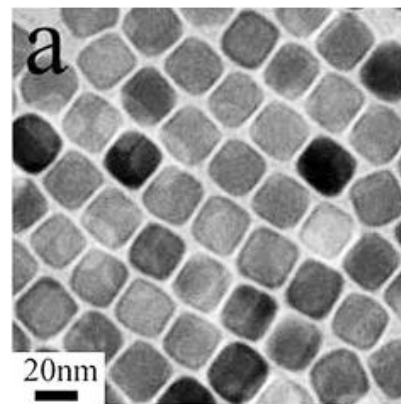
LOW t° SYNTHESIS OF QUANTUM DOTS

Application of quantum dots

- biomedical imaging
- solar power
- electronics



CdSe quantum dots



PbS quantum dots

LOW t° SYNTHESIS OF QUANTUM DOTS

Existing colloidal chemistry

- capping agents: oleic acid
- high temperatures: 250 – 350 °C
- chalcogenide precursors: TOPS



Our approach

- cryogenic solvent
- temperature as low as 20-60 °C
- elemental S or Se as precursors

RECYCLING OF WASTE POLYMERS

Tire rubber



Biomass



E-waste

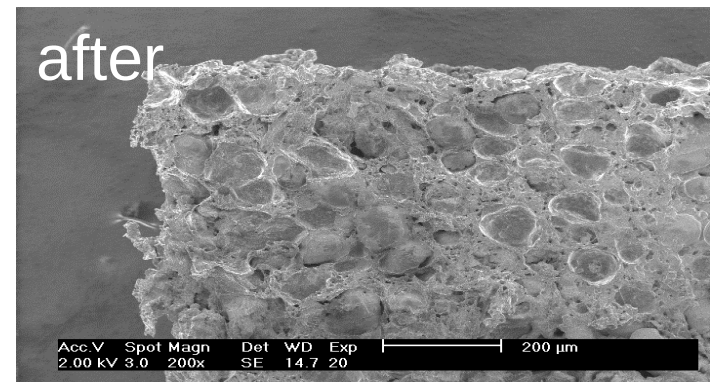
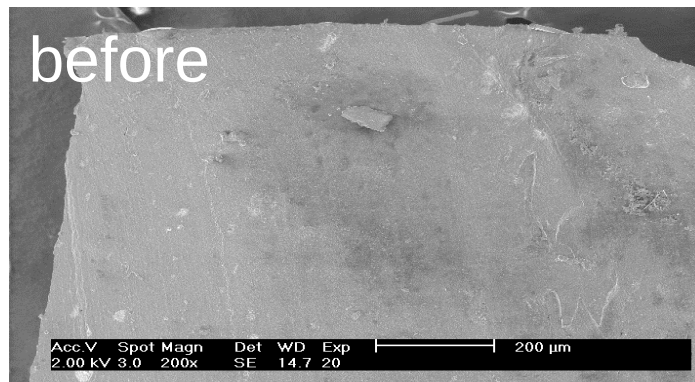


One chemistry – different products

Supported by an SBIR Phase I grant from NSF

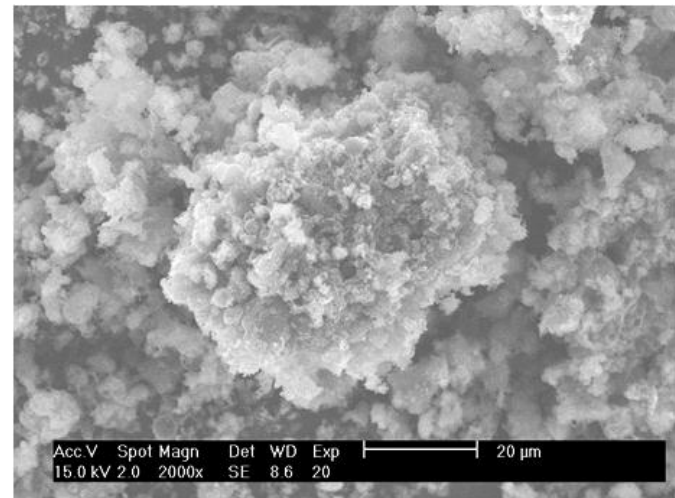
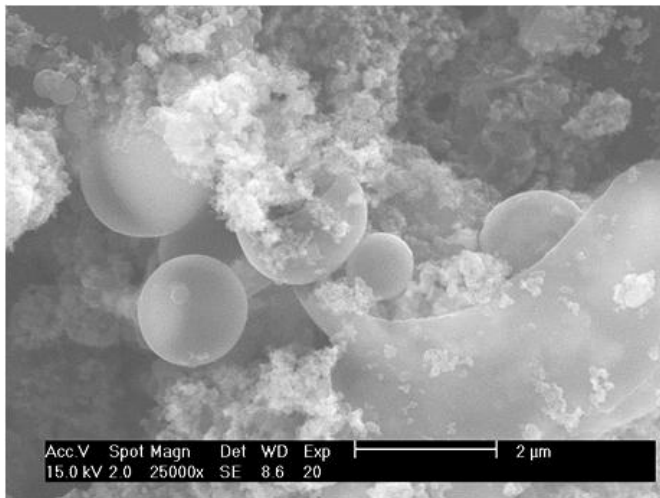
RECYCLING OF WASTE POLYMERS

Rubber crumb, temperature $< 100^{\circ}\text{C}$



RECYCLING OF WASTE POLYMERS

Rubber crumb, temperature $> 130^{\circ}\text{C}$



1. Soil amendment agent

- ☐ slow-release N fertilizer
 - less frequent fertilizer application
 - prevention of fertilizer runoff
- ☐ water-retention agent
 - golf courses, sports fields, sod growing, horticulture



2. Biofilm support and source of nutrients

- ☐ bioremediation of waste water from oil, gas, and coal mining operations



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