

Anna Loiudice

PostDoc fellow

Joint Center for Artificial Photosynthesis

Lawrence Berkeley National Laboratory

e-mail: alojudice@lbl.gov

RESEARCH INTEREST

- Nanomaterials synthesis and assembling in complex functional materials.
- Nanocrystal integration in devices for energy applications.

EDUCATION

PhD in Bio-Molecular Nanotechnologies

07/2013

University of Salento, Department of Physic, Lecce, Italy

Thesis: *“Third generation solar cells: exploring novel geometries towards high efficiency and flexible devices”*.

Major Field: Device fabrication

Minor Field: Synthesis

Advisor: Prof. G. Gigli

Co-advisor: Dr. A. Rizzo

M. S in Science and Technologies of Materials, Chemistry of Materials

12/2009

University of Bari, Bari, Italy

Thesis: *“Low band gap poly (1,4-arylene-2,5-thienylene)s with benzothiadiazole units: synthesis, characterization and application in polymer solar cells”*.

magna cum lode

Advisor: Prof. G. Farinola

Co-advisor: Dr. A. Operamolla

B. S in Science of Materials

12/2007

University of Bari, Bari, Italy

Thesis: *“Analysis of a new methodology for the synthesis of semiconductor polymers”*.

magna cum lode

Advisor: Prof. G. Farinola

Co-advisor: Dr. A. Operamolla

RESEARCH EXPERIENCE

Visiting PhD student at the Molecular Foundry for *ligand-stripped nanocrystals assembly for solar cells*.

02/2013

Lawrence Berkeley National Laboratory, Berkeley

Referee: Dr. R. Buonsanti

Visiting student at the National Nanotechnology Laboratory for *fabrication of organic solar cells*.

07-11/2009

Lecce, Italy

Referee: Prof. G. Gigli

EMPLOYMENT:

**Postdoctoral Fellow at The Joint Center for Artificial Photosynthesis
Lawrence Berkeley National Laboratory, Berkeley, CA.**

03/2014-present

Advisor: Dr. R. Buonsanti

- Colloidal synthesis of complex-metal oxide for oxidation reactions
- Photoelectrochemical characterizations

**Postdoctoral Fellow at Italian Institute of Technologies
Lecce, Italy.**

09/2013-02/2014

Advisor: Prof. G. Gigli

- Surface chemistry of colloidal quantum dots
- Colloidal quantum dot solar cells

SKILLS AND EXPERTISE

- Chemical synthesis of inorganic nanocrystals by means of colloidal techniques;
- Chemical synthesis and purification of organic polymer;
- Use of standard air-free techniques (Schlenk-line, glove box);
- Electron microscopy characterization of nanocrystals: SEM, TEM;
- Structural characterization with X-Ray scattering techniques;
- X-Ray absorption spectroscopy, X-ray photoelectron spectroscopy;
- Spectroscopic investigation techniques: UV-Vis, FT-IR;
- Atomic force microscopy (AFM) characterization of nanocrystals and polymers;
- Solar cell fabrication by using spin-coater and evaporation technique;
- Solar cell characterization by means of a solar simulator;
- Photoelectrochemical characterization of photoelectrodes for oxidation reactions.

PUBLICATIONS

- 15) Lynch, J.; Giannini, C.; Jason K. Cooper, J. K.; **Loiudice, A.**; Sharp, I. D.; Buonsanti, R. "Substitutional or interstitial site-selective nitrogen doping in TiO₂ nanostructures", J. Phys. Chem. C., **2015**, 119, 7443.
- 14) **Loiudice, A.**; Rizzo, A.; Grancini, G.; Taurino, A.; Belviso, M. R.; Corricelli, M.; Curri, M. L.; Cozzoli, P. D.; Petrozza, A.; Lanzani, G.; Gigli, G. "Room-Temperature Processable High Quality 3D-Nanostructured Electrode for improved Depleted Bulk Heterojunction performance", ACS Appl. Mater. Interfaces, **2014**, 6 (7), 5026.
- 13) Giansante, C.; Carbone, L.; Giannini, C.; Altamura, D.; Ameer, Z.; Maruccio, G.; **Loiudice, A.**; Belviso, M. R.; Cozzoli, P. D.; Rizzo, A.; Gigli, G. "Surface chemistry of arenethiolate-capped PbS quantum dots and application as colloiddally stable photovoltaic ink", Thin Solid Films **2014**, 560, 2-9.
- 12) **Loiudice, A.***; Rizzo, A.; Corricelli, M.; Curri, M. L.; Belviso, M. R.; Cozzoli, P. D.; Grancini, G.; Petrozza, A.; Gigli, G. "Room-Temperature Treatments for All-Inorganic Nanocrystal Solar Cell Devices", Thin Solid Film, **2014**, 560, 44.
- 11) Grisorio, R.; Allegretta, G.; Suranna, G. P.; Mastrorilli, P.; **Loiudice, A.**; Rizzo, A.; Gigli, G.; Manola, K.; Magliulo, M.; Torsi, L. "Poly(arylene-ethynylene)s containing anthracene and silole-based units: synthesis, electronic and photovoltaic properties", Journal of Polymer Science Part A: Polymer Chemistry, **2013**, 51, 4860.
- 10) Resta, V.; Caricato, A. P.; **Loiudice, A.**; Rizzo, A.; Gigli, G.; Taurino, A.; Catalano, M.; Martino, M. "Pulsed laser deposition of a dense and uniform Au nanoparticles layer for surface plasmon enhanced efficiency hybrid solar cells", Journal of Nanoparticle Research, **2013**.
- 9) Giansante, C.; Carbone, L.; Giannini, C.; Altamura, D.; Ameer, Z.; Maruccio, G.; **Loiudice, A.**; Belviso, M.; Cozzoli, P. D.; Rizzo, A.; Gigli, G. "Colloidal Arenethiolate-Capped PbS Quantum Dots for Solution-Cast Photovoltaics" J. Phys. Chem. C, **2013**, 117, 13305.
- 8) **Loiudice, A.**; Rizzo, A.; Grancini, G.; Biasiucci, M.; Belviso, M. R.; Corricelli, M.; Curri, M. L.; Striccoli, M.; Agostiano, A.; Cozzoli, P. D.; Petrozza, A.; Lanzani, G.; Gigli, G. "Fabrication of flexible all-inorganic nanocrystal solar cell by room-temperature processing" Energy Environ. Sci. **2013**, 6, 1565.
- 7) Di Maria, F.; Gazzano, M.; Zanelli, A.; Gigli, G.; **Loiudice, A.**; Rizzo, A.; Biasiucci, M.; Salatelli, E.; D' Angelo, P.; Barbarella, G. "Synthesis and Photovoltaic Properties of Regioregular Head-to-Head Substituted Thiophene Hexadecamers" Macromolecules **2012**, 45 (20), 8284.

6) **Loiudice, A.**; Rizzo, A.; Biasiucci, M.; Gigli, G. “Bulk Heterojunction versus Diffused Bilayer: The Role of Device Geometry in Solution p-Doped Polymer-Based Solar Cells” J. Phys. Chem. Lett. **2012**, 3, 1908.

5) **Loiudice, A.**; Rizzo, A.; Latini, G.; Nobile, C.; de Giorgi, M.; Gigli, G. “Graded vertical phase separation of donor/acceptor species for polymer solar cells” Solar Energy Materials & Solar Cells **2012**, 3, 1908.

4) **Loiudice, A.**; Rizzo, A.; De Marco, L.; Belviso, M.R.; Caputo, G.; Cozzoli, P.D.; Gigli, G. “Organic photovoltaic devices with colloidal TiO₂ nanorods as key functional components” Phys. Chem. Chem. Phys. **2012**, 14, 3987.

3) Grisorio, R.; Allegretta, G.; Suranna, G.P.; Mastroilli, P.; **Loiudice, A.**; Rizzo, A.; Mazzeo, M.; Gigli, G. “Monodispersed vs. polydispersed systems for bulk heterojunction solar cells: the case of dithienopyrrole/anthracene based materials” J. Mater. Chem. **2012**, 22, 19752.

2) Caricato, A.P.; Cesaria, M.; Gigli, G.; **Loiudice, A.**; Luches, A.; Martino, M.; Resta, V.; Rizzo, A.; Taurino, A. “Poly-(3-hexylthiophene)/[6,6]-phenyl-C61-butyric-acid-methyl-ester bilayer deposition by matrix-assisted pulsed laser evaporation for organic photovoltaic applications” Applied Phys. Lett. **2012**, 100, 073306.

1) Operamolla, A.; Colella, S.; Musio, R.; **Loiudice, A.**; Hassan, H. O.; Melcarne, G.; Mazzeo, M.; Gigli, G.; Farinola, G. M.; Babudri, F. “Low band gap poly(1,4-arylene-2,5-thienylene)s with benzothiadiazole units: Synthesis, characterization and application in polymer solar cells” Solar Energy Materials & Solar Cells **2011**, 95, 3490.

CONTRIBUTIONS TO CONFERENCES

Oral Presentation: “*Multicomponent Nanocrystals as Atomically-Defined Building Blocks for Heterostructured Nanocomposites*”,
Material Research Society (MRS) Spring meeting 2015, San Francisco, CA

Poster Presentation: “*Colloidal synthesis of nanocrystal heterodimers to build BiVO₄/metal oxide inorganic nanocomposites*”
Gordon Research Conference, Nanomaterial for Energy, 2015, Ventura, CA

Oral Presentation: “*Flexible all-inorganic nanocrystal solar cell by room-temperature processing*”,
European Materials Research Society (E-MRS13) Spring Meeting 2013, Strasbourg, France

Oral Presentation: “*Flexible all-inorganic nanocrystal solar cell by room-temperature processing*”,

Hybrid and Organic Photovoltaics (HOPV13) 5th International Conference 2013, Seville, Spain

Oral Presentation: “*Bulk Heterojunction versus Diffused bilayer: The Role of Device Geometry in solution p-Doped Polymer-Based Solar Cells*”,
Organic Materials for a Better Future (FUTURMAT2) 2nd International Meeting 2012, Brindisi-Italy

Oral Presentation: “*Graded Vertical Phase Separation of Donor/Acceptor Species for Polymer Solar Cells*”

Poster Presentation: “*Organic Photovoltaic Devices with Colloidal TiO₂ Nanorods as Key Functional Components*”

Hybrid and Organic Photovoltaics (HOPV12) 4th International Conference 2012, Uppsala-Sweden

Poster Presentation: “*Hybrid Colloidal Nanocrystal/Organic Solar Cells*”,
Nanomaterials Based on Inorganic Materials (HERODOT) international school 2011, Cargese-Corsica

Poster Presentation: “*Synthesis of Poly-p-Arylenethienylenes for Application in Bulk-Heterojunction Solar Cells*”,

Organic Materials for a Better Future (FUTURMAT1) First International Meeting 2009, Ostuni-Italy

SCHOOLS

- Nanomaterials Based on Inorganic Materials (HERODOT) international school 2011, Cargese-Corsica
- Nanostructured Hybrid Materials for Energy Conversion and Storage international summer school 2012, Ostuni-Italy