

VAIDYANATHAN (RAVI) SUBRAMANIAN, PhD

Associate Professor
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CURRICULUM VITAE

SYNOPSIS

Prof. Subramanian started as an Assistant Professor of Chemical Engineering in the Chemical and Materials Science Department of University of Nevada, Reno. He received his tenure and promotion in July 2012 and is currently an Associate Professor of Chemical Engineering. He is on the graduate faculty of the Electrical and Biomedical Engineering Department and an adjunct in the Chemistry Department. He is also the Solar Energy thrust area coordinator in the Renewable Energy Center at the University. Prof. Subramanian holds a Ph.D. in Chemical Engineering from the University of Notre Dame, Masters from University Institute of Chemical Technology, India, and Bachelors from the Laxminarayan Institute of Technology, India. His area of research focus is on nanostructured materials for solar energy utilization. He has expertise in the synthesis, characterization, and application of photoactive materials in photovoltaics, clean fuel production, and environmental remediation. In his 12 years of research he has developed inorganic materials including semiconductor-semiconductor and semiconductor-metal nanocomposites for applications related to solar energy utilization and fuel cells.

Prof. Subramanian has received research grants and contracts from federal agencies such as the National Science Foundation, the Department of Defense (DARPA), the Department of Energy, as well as from industrial partners. He has led funded projects worth over a million dollars. He has published over 40 papers, which include research contributions, pedagogy and curriculum development contributions, patent disclosures, and book chapters. He has two papers with over 450 citations. Prof. Subramanian is co-editing a book to be published by Springer on the topic of solar fuels. He has guest edited a special issue of the *Journal Catalysis Today*. His scientific contributions have been published in *Chemical Communications*, *Industrial Engineering Chemistry Research*, *Applied Catalysis A/B*, *Journal of Physical Chemistry C*, *Environmental Science and Technology*, *Energy and Fuels*, *Journal of Power Sources*, and *Journal of Materials Research*. His work has been presented in over 30 invited, contributed, and poster presentations at local, national, and international meetings. He currently holds one patent and has one other pending application. He has several collaborations at the national and international level with professors from Universities and scientists at the National Laboratories and has actively participated in NSF review panels.

Prof. Subramanian has contributed to human resources development as a post-doctoral and visiting scientist mentor, graduate research advisor, and undergraduate instructor. He has researchers and students from multidisciplinary backgrounds including Chemistry, Physics, and Engineering. He has offered students an opportunity to participate in international exchange programs and provided them a platform to benefit from a global engineering education. He has mentored two post-doctoral researchers, graduated 3 Masters, 1 PhD, and currently has 2 Masters and 2 PhD students in his group. He has taught almost all the course in the Chemical Engineering Curriculum the chief ones being ChE 102 – Introduction to Chemical Engineering, ChE 245 – Numerical methods in Chemical Engineering, ChE 374 – Transport Phenomena II, and ChE 440 – Chemical Reactor Design. He has also taught multidisciplinary courses such as ChE 301 – Alternate Energy – I and is currently in the process of developing an online course on Solar Energy (Will be published as a book by Elsevier Publications, 2014). He has also taught a graduate level course: ChE 741 – Advance Transport Phenomena. He has developed three new courses including one online course on solar energy for distance learning students.

Prof. Subramanian has participated in several educational and outreach activities since he joined as a faculty. He has conceived and established a forum called Sustainable Energy Forum (SEF) in 2009 that brings together students from different disciplines to discuss about alternate energy. He has served as the founding faculty mentor of SEF for two years. He has served and continues to be in committees at the Department, College, and University levels. He is actively involved in national and international technical programming committees in organizations including AIChE, ECS, and ACS. He is also serving as the travel grant coordinator at the ECS-energy technology division since 2010. He has mentored over 14 undergraduate students on research thesis through various scholarships from within and outside the University. He has actively participated in the mentoring of K 12 students from local schools.

POSITIONS HELD

2012 – Present	–	Associate Professor, Chemical Engineering, Univ. of Nevada, Reno
2013	–	Adjunct Associate Professor, Chemistry Univ. of Nevada, Reno
2009 – Present	–	Renewable Energy Center, Solar energy – lead
2008 – Present	–	Adjunct, Electrical and Biomedical Engineering, Univ. of Nevada, Reno
2006 – 2012	–	Assistant Professor, Chemical Engineering, Univ. of Nevada, Reno
2005 – 2006	–	Research Assistant Professor, Univ. of Illinois, Urbana

EDUCATION

2004 – 2005	–	Post-doctoral Associate, Univ. of Illinois, Urbana Mentors: <i>Dr. R. Masel, Dr. M. Shannon, and Dr. E. Seebauer</i>
1999 – 2004	–	PhD, Univ. of Notre Dame, Indiana Graduation: <i>15 May 2004</i> Degree: <i>PhD, Chemical Engineering</i> Advisors: <i>Dr. Prashant Kamat and Dr. Eduardo Wolf</i> Dissertation: <i>Photoelectrochemical and photocatalytic aspects of semiconductor – metal nanocomposites</i>
1997 – 1999	–	M. Chem., Univ. of Mumbai, India
1992 – 1996	–	B. Tech., Univ. of Nagpur, India

HONORS AND RECOGNITIONS

- Promoted as Associate Professor of Chemical Engineering (2011)
- Best graduate thesis Award, University of Notre Dame (2004)
- AIChE best poster Award (2004)
- Catalysis Club of Chicago, Best Poster Award (2002, 2003)
- University Grants Commission scholarship for MChem degree (1997-99)

UNIVERSITY SERVICE (University of Nevada, Reno)

- CoE representative to University Graduate Committee (2012-present)
- Undergraduate advisor, Chemical Engineering Program (2006-present)
- Member, University scholarship committee (2010-present)
- Member, undergraduate students recruitment committee (2007-present)
- Member, University technology committee (2008-09)
- Member, graduate students recruitment committee (2007-08)

PROFESSIONAL SERVICE

- American Institute of Chemical Engineers (AIChE)
 - Planning committee member, Division 20A (2009-present)
 - Planning committee member, Division 20B (2008-10)
 - Chairs and co-chairs of several sessions

- Electrochemical Society (ECS)
 - Planning committee member, Energy Technology Division (2008-present)
 - Elected travel committee chair for ETD travel grants
 - Co-chair of sessions supported by ETD.
- Editorial services
 - Books
 - Springer publications, “Materials and Processes for Solar Fuel Production” Ed: V. Subramanian (USA), B. Viswanathan (India), and J.S. Lee (Korea), expected in print - 2013.
 - Journals
 - Managing Guest Editor – Catalysis Today (Topic: Photocatalysts for Solar Hydrogen). The full issue is expected to be published by the 3rd quarter of 2012.
 - Manuscript reviews
 - Angewandte Chemie International edition, Journal of American Chemical Society, Industrial engineering chemistry research, Environmental Science and Technology, Journal of Physical Chemistry – B,C, Photochemistry and Photobiology, and Electrochemistry communications
 - Proposal reviewer for grant agencies
 - NSF-CBET, DMR
 - NSF-REU
 - ACS-PRF

INDUSTRIAL EXPERIENCE

- Process and sales engineer, Thermax LTD, Pune, India (June 2006-June 2007)
- Engineer Trainee, Rashtriya Chemicals and Fertilizers, Mumbai, India (Summer 2003)
- Engineer Trainee DCL Polyester, Nagpur, India (Summer 2002)

PAST and PRESENT FUNDED RESEARCH PROJECTS

Total funding (Aug 2006 - current) / Funding to date (\$ 1,141,957)

- Current funding
 - NSF – CBET - Collaborative Research : Bandgap Engineered Composite Oxide Nanomaterials (BECONs) for Solar Energy Conversion - \$256, 785.(Aug 2011-July 2014)
 - DOE – Catalyst development for low cost high efficiency visible light harvesting quantum dot solar cells \$ 241,080 (Oct 2010 – Dec 2011) includes \$ 44,722 cost share - likely to extend up to Dec 2012.
- Past funding
 - DoE/UNR-TTO – Integrated micro/mill scale hydrogen generator-fuel cell systems
DoE – “Catalyst development for solid-state dye sensitized solar cells”
 - ThermoEnergy^y® – Catalyst development for low temperature SO₂ oxidation in flue gas
 - DoD/ARPA-MTO – Micro-power generation (Jan-2007 – Aug-2008)

- UNR VPR office* – Infrastructure for laboratory, equipments, consumables and student support

*These funds were provided by the UNR Office of the Vice-President for Research, Office of the Dean of the College of Engineering, and the Department of Chemical and Metallurgical Engineering as a combined start up package for new faculty.

RESEARCH ADVISING, MENTORING, and TEACHING RESPONSIBILITIES

- **Research Thesis Advising**

[PhD: 1 graduated, 3 current; MS: 3 graduated, 1 current]

PhD Thesis

Current

- Bradley Allured (PhD candidate, started on May 2012)
 - *Dissertation title:* Hydrogen production using visible light assisted pyrchlore – based materials
 - [Expected graduation: Aug 2016]
- Swagatom Sarker (PhD candidate, started on Aug 2011)
 - *Dissertation title:* Photocatalytic properties of visible light harvesting pyrochlore -based multi-metal oxides
 - [Expected graduation: Aug 2015]
- Tasha Goodrich (PhD candidate, started on May 2011)
 - *Dissertation title:* Photocatalytic activity of sillenite type multi-metal oxides synthesized using a novel one step process.
 - [Expected graduation: May 2015]

Former

- Archana Kar, (PhD awarded: May 2009)
Dissertation title: Multifunctional applications of Titanium dioxide nanotubes [Employed, Scientist, TN]

MS Thesis

Current

- Nazrul Majoumder (MS candidate, started on May 2011)
 - *Dissertation title:* Designing photoactive materials for boosting formic acid electrooxidation.
 - [Expected date of graduation: Dec 2012]
- Bowen Yu (MS candidate, started on May 2009)
 - *Dissertation title:* Designing of bismuth titanate-based oxide materials for energy production using solar irradiation.
 - [Expected date of graduation: Dec 2012]

Former

- Winn Wilson (MS awarded: May 2012)
Dissertation title: Heterogeneous photocatalytic process to produce hydrogen by water splitting on TiO₂-CdS composites using environmental waste products.[Employed, MA]
- York Smith (MS awarded: May 2011)
Dissertation title: Physicochemical and geometrical factors that influence the photocatalytic degradation kinetics of model water contaminants. [PhD student, UT]
- Yon Sun Sohn (MS awarded: May 2009)

Dissertation title: Photocatalytic activity of anodized TiO₂ nanotubes for environmental applications. [Lawyer, TX]

- **Mentoring post-doctoral researchers**
 - Dr Sankaran Murugesan [PhD, 2007] (July 2007-Dec 2008)
 - *Education:* Indian Institute of Technology, Chennai, India
 - (Presently: Post doctoral associate with Prof. Keith Stevenson, Univ. of Texas, Austin)
 - Dr Bratindranath Mukerjee [PhD 2010] (July 2010-current)
 - *Education:* Indian Institute of Science, Bangalore, India
- **Mentoring visiting research scientists**
 - Dr. Archana Kar [PhD 2004] (2012 – 3 months)
 - Oxide composites for multifunctional applications
 - Dr. Arunabha Kundu [PhD 2004] (2010-11 – 3 months)
 - Microdevices design and development for portable fuel cells
- **Mentoring as a Research Professor at University of Illinois, Urbana, IL**
 - Nicholas N Diege (PhD, Chemical Engineering)
 - Zong Ni (PhD, Chemical Engineering)

- **Mentoring undergraduate research**

[18 students]

	Name	Joining year	Joining level	Time in lab	Presently at	^{*3}	
1	Dawson, A.	Mentored as a part of PhD activities at Notre Dame (1999-00)					
2	Heuhn, R	Mentored as a part of PhD activities at Notre Dame (2000-01)					
3	Choi, J.	Mentored as a part of post-doctoral activities at UIUC (2004-05)					√
4	Wilhoite, T.	Mentored as a part of post-doctoral activities at UIUC (2004-05)					√
5	Javed, U.	2006	Junior/Senior	1.5 years	Industry, NV	√	
6	Smith, Y. ^{*1}	2007	Junior/Senior	2 years	PhD, UT	√	
7	Pando, R.	2007	Senior	1 years	Industry, NV	√	
8	Myers, K. ^{*1}	2007	Sophomore	2 years	Army, WA	√	
9	Lee, S. ^{*1}	2008	Junior/Senior	2 years	MS, NV	√	
10	Vandavier, M.	2010	Senior	1 year	PhD, CO	√	
11	Amin, F.	2008	Summer	3 months	BS, NV		
12	Mischel, N.	2009	Junior	1 year	Industry, NV		
13	Jaeger, V.	2009	Senior	1 year	PhD, WA	√	
14	Zamaro, A. ^{*1}	2010	Junior	1 year	BS, NV		
15	Peterson, A. ^{*2}	2011	Junior	1 year	BS, NV	√	
16	DelaCruz, S. ^{*2}	2012	Sophomore	1 year – current	BS, NV		
17	Cone, E. ^{*3}	2012	Junior	Current	BS, NV		
18	Abbas, S.	2012	Junior	Current	BS, NV		

^{*1} recipient of \$ 1500 general undergraduate research award

^{*2} recipient of \$ 1000 from National science foundation – Research experience for undergraduates.

^{*3} McNair Scholar

^{*4} Students receiving authorships in peer-reviewed publications are indicated with √.

- **Mentoring high school students**

[3 students]

	Name	Joining year	Joining level	Time in lab	Coordinator

1	Myers, Kirby	2006-07	K-12	80 hours	Madelyn Reed ^{*1}
2	Nathan, Rysel	2012	K-10	80 hours	Self
3	Torres, Daniel	2012	K-12	80 hours	Melissa LiCon ^{*1}

^{*1} Gifted and Talented Program Coordinator, Washoe County School System

- **Thesis Committees (* in current committee)**

- D. Chidambaram (1PhD*, 1MS)
- Qizhen Li (1PhD*, 1 MS)
- Mario Alpuche (2 PhD*)
- Mano Misra (1 MS)
- Alan Fuchs (1PhD, 1 MS)
- Banwali Rawat (1 MS)

- **Teaching responsibilities [last 5 years]**

(7 undergraduate and 2 graduate courses in Chemical Engineering, 2006 - to date)

- Fall 2012 – Chemical Reaction Engineering (ChE 440/640)
– Solar Energy: (ENGR 650- online only)
- Spring 2012 – Heat and Mass Transport (ChE 374)
– Introduction to Chemical Engineering (ChE 102)
- Fall 2011 – Chemical Reaction Engineering (ChE 440/640)
- Spring 2011 – Heat and Mass Transport (ChE 374)
– Introduction to Chemical Engineering (ChE 102)
- Fall 2010 – Chemical Reaction Engineering (ChE 440/640)
- Spring 2010 – Heat and Mass Transport (ChE 374) – co-taught with
Material Science
– Introduction to Chemical Engineering (ChE 102)
- Fall 2009 – Chemical Reaction Engineering (ChE 440/640)
– Alternate Energy I (ChE 301)
- Spring 2009 – Advanced Transport Phenomena I (ChE 764)
– Introduction to Chemical Engineering (ChE 102)
- Fall 2008 – Chemical Reaction Engineering (ChE 440/640)
– Alternate Energy I (ChE 301)
- Spring 2008 – Numerical Methods in Chemical Engineering (ChE 245)
– Introduction to Chemical Engineering (ChE 102)
- Fall 2007 – Chemical Reaction Engineering (ChE 440/640)
- Spring 2007 – Numerical Methods in Chemical Engineering (ChE 245)
– Unit Operations Laboratory II (ChE 442)

- **Courses developed/restructured**

- Developing currently – Solar Energy: Fundamentals, Processes, and prospects (ENGR 650)
- Developed – Alternate Energy I (ChE 301)
- Restructured – Introduction to Chemical Engineering (ChE 102)
- Restructured – Chemical reactor design (ChE 440/640)

RESEARCH PRESENTATIONS (from University of Nevada, Reno)

(Invited)

1. Indian Institute of Science, Bangalore, Materials Research Center “Strategies for Developing Visible Light Harvesting Photocatalytic Materials and its Applications” IISc, India Dec 2012 [Host: A.K. Shukla, IISc, Banagalore]
2. Indian Institute of Technology, Chemical Engineering and Chemistry Seminar “Strategies for Developing Visible Light Harvesting Photocatalytic Materials and its Applications” Chennai, India Dec 2012 [Host: B. Viswanathan, Director, NCCR, IIT, Chennai]
3. 244th ACS Meeting, Philadelphia “Development of titanate pyrochlores $\text{Bi}_2\text{Ti}_2\text{O}_7$ for photocatalytic hydrogen production” Aug 2012 [Host: DIVISION: ENFL: Division of Energy and Fuels Velu Subramani].
4. Arizona State University, Phoenix, Materials Seminar Series “Multi-functional Applications of Anodized Titanium Oxide-Based Materials” Feb 2012 [Host: Prof. S. Dey]
5. University of Notre Dame, South Bend, Chemical Engineering Department seminar, “Application of Anodized Titanium Oxide Nanotubes for Energy and Environment” Oct 2011 [Host: Prof. E. Wolf]
6. 219th ECS meeting, “Multi-functionality of TiO_2 nanotubes” Montreal, Canada, May 2011 [Host: Prof. H. Imahori]
7. Washington State University, Pullman, Chemical Engineering Department seminar, “Multifunctional photocatalytic materials for energy and environmental applications”, Sept. 2010 [Host: Prof. J. Petersen]
8. University of Nevada, Reno, Civil and Environmental Engineering seminar, “Applications of TiO_2 nanotubes for environmental remediation”, Feb. 2010 [Host: Prof. E. Kolodeiz]
9. University of New Mexico, Albuquerque, Chemical and Mechanical Engineering seminar, “Multifunctional titanium Oxide nanostructures and its composites for solar energy conversion”, Jan. 2010 [Host: Prof. P. Atanassov]
10. University of West Virginia, Physics Department seminar, “Solar energy conversion using multifunctional titanium oxide nanostructures”, Nov. 2009 [Host: Prof. J. Lewis]
11. Indian Institute of Technology, Chennai, Chemistry Department seminar, “A semi-continuous milli-scale flow reactor for hydrogen generation for portable applications”, Dec. 2008 [Host: Prof. B. Viswanathan]
12. Reno-Tahoe Photonic Society “Novel supports for electrooxidation of formic acid”, Apr. 2007 [Host: Prof. M. Tayahi]
13. Intelligent Energy[®] seminar “Design and development of multifunctional hydrogen generators for portable applications” Long Beach, CA Apr. 2009 [Host: Dr. D. Dura]

(Other research presentations- oral(O) and poster (P))

Conference papers: 15 of 22 [* presenting author]

[The reminder 7 are merit review presentation to funding agencies]

1. IPS-19 (Intl. Conf. on Photochemical Conversion and Storage of Solar Energy), “p-n Junction Chalcogenide Heterostructure Nanowires: Synthesis and

- Photoelectrochemical Properties” Mukerjee, B., Smith, Y. Subramanian, V.* CALTECH, Pasadena, July 2012 (O)
2. IPS-19 (Intl. Conf. on Photochemical Conversion and Storage of Solar Energy), “1D CdS/PbS Heterostructured Nanowire Synthesis Using Cation Exchange” Mukerjee, B., Smith, Y. Subramanian, V.* CALTECH, Pasadena, July 2012 (P)
 3. 221th ECS meeting, “Surface, Optical, and Photoelectrochemical Properties of CdSe Coated TiO₂ Nanotube Arrays Synthesized Using a One-Pot Solvothermal Process” Mukerjee, B., Smith, Y. Subramanian, V.* Seattle, Washington, May 2012 (O)
 4. 219th ECS meeting, “Titania nanotubes grown on wires and mesh and their photocatalytic and photovoltaic applications” Smith, Y. Subramanian, V.* Montreal, Canada, May 2011 (O)
 5. 219th ECS meeting, “A new flexible quantum dot solar cell: Heterostructural TiO₂ mesh-TiO₂ nanoparticles photosensitized with CdS” Smith, Y.*, Subramanian, V. Montreal, Canada, May 2011 (O)
 6. 219th ECS meeting, “In situ deposition of quantum dots onto titania nanotubes via solvothermal method” Mukerjee, B., Smith, Y., Subramanian, V.*, Montreal, Canada, May 2011 (O)
 7. 219th ECS meeting, “Photocatalytic degradation of methyl orange using hydrothermal synthesized bismuth titanate (Bi₁₂TiO₂₀)” Smith, Y. *, Subramanian, V. Montreal, Canada, May 2011 (O)
 8. (Invited) 218th ECS meeting, “Multi-functionality of TiO₂ nanotubes” Montreal, Canada, May 2011 (O)
 9. 2nd NV-Renewable energy center meeting, “Low cost High Efficiency photocatalysts” Las Vegas, August 2010 (P)
 10. 217th ECS meeting, “Electrooxidation of formic acid over nitrogen-substituted carbon nanotubes” Murugesan, S., Subramanian, V.*, Vancouver, Canada, Apr. 2010 (O)
 11. AIChE Annual meeting, 2009 “Hydrogen production using non-traditional photocatalysts” Murugesan, S. Subramanian, V.*, Nashville, TN, Nov. 2009 (O)
 12. AIChE annual meeting 2009 “Nitrogen – substituted carbon nanotubes as supports for Pt catalysts in formic acid electrooxidation”, Myers, K. Subramanian, V.* Nov. 2009 (O)
 13. 215th ECS meeting, “Can graphene be a support for Pt in formic acid electrooxidation?” San Francisco, CA, Murugesan, S., Subramanian, V. *, May 2009 (O)
 14. AIChE annual meeting 2008 “Electrooxidation of formic acid over Pt supported on carbon nanotubes” Murugesan, S, Subramanian, V.* Philadelphia, PA, Nov. 2008 (O)
 15. Society of Photo-optical Instrumentation Engineers (SPIE) – “Sonochemical synthesis of low bandgap Titania nanotubes for photoelectrochemical generation of hydrogen” Y. Sohn, Subramanian, V. *, San Diego, CA, Sept. 2007 (O)

INFORMATIVE/EDUCATIONAL/RECRUITMENT PRESENTATIONS

1. *[Informative/Recruitment]* 13th workshop on Fundamental and applied catalysis, Indian Institute of Technology, Chennai, India, Dec 2012 [*Invited: B. Viswanathan, Director, NCCR, IIT, Chennai*]
 - a. Talk I – Application of reaction engineering to determine the kinetics of a photocatalytic process
 - b. Talk II – Techniques to determine the photoelectrical properties of a photocatalyst
2. *[Informative]* Next generation photoactive materials for space applications - Gravity and Radiation Environment Aerial Trans-Small Satellite Surveyors (GREATS) Workshop - Subramanian, V.* Univ. of Nevada, Las Vegas, NV Sept 2012 [*Invited: Ke – Xun (Kevin) Sun, Professor, Electrical Engineering, UNLV*]
3. *[Informative]* Opportunities for Industry-University partnerships in Geothermal energy “Interfacing Solar Energy with Geothermal Energy” Subramanian, V.* Reno, NV, August 2012 [*Invited: Wendy Calvin, Geothermal Engineering, UNR*]
4. *[Educational]* GK12 presentation to graduate students and K12 teachers “Solar Energy: Science, Possibilities, and Current Research” Subramanian, V.* Reno, NV, August 2012 [*Invited: Kam Leang, Mechanical Engineering, UNR*]
5. *[Recruitment]* 218th ECS meeting, IEEE sponsored Outreach Participant for recruitment to college of engineering. Ramani, V.*, Subramanian, V.*, Las Vegas, NV October 2010
6. *[Educational]* Intro to Engineering Summer Camp, UNR “Renewable Energy Careers” Subramanian, V.* Reno, NV, June 2009
7. *[Recruitment]* Laxminarayan Institute of Technology “Alternate energy and Chemical Engineering” Subramanian, V.*, Maharashtra, India, December 2008
8. *[Educational]* Intro to Engineering Summer Camp, UNR “Renewable Energy: Importance and Applications” Subramanian, V.* Reno, NV, June 2008
9. *[Educational]* Sparks High School, Presentations to K 12 science teachers from Washoe County School district, “Careers in Energy” Subramanian, V.* Reno, NV, Aug 2007

REFEREED PUBLICATIONS

In archival journals from UNR

*** Corresponding author**

1. Subramanian, V.* Sarker, S.; Yu, B.; Kar, A.; Sun, X.; Dey, S.K.; TiO₂ Nanotubes and its Composites: Photo-Catalytic and Other Photo Driven Applications [Accepted: *JMR-2012-0366*]
2. Mukerjee, B.; Wilson, W.; Subramanian, V.* TiO₂ Nanotube (T_NT) surface treatment revisited: Implications of ZnO, TiCl₄, and H₂O₂ treatment on the photoelectrochemical properties of T_NT and T_NT/CdSe. [Accepted: *NR-ART-06-2012-031660*]
3. Wilson, W.; Manivannan, A.; Subramanian, V.* Heterogeneous photocatalytic degradation of recalcitrant pollutants over CdS - TiO₂ nanotubes: Boosting effect of TiO₂ nanoparticles at nanotube-CdS interface *Appl.Catal. A- General, 2012, 441,28,1-9.*

4. **(Featured as cover art)** Mukerjee, B.; Smith, Y.; Subramanian, V.* CdSe nanocrystal assemblies on anodized TiO₂ nanotubes: Optical, Surface, and Photoelectrochemical properties. *J.Phys.Chem.C.* 2012, 11, 29, 15175-15184.
5. Mukerjee, B.; Peterson, A.; Subramanian, V.* Synthesis of 1D CdS/PbS heterostructured nanowires through cation exchange *Chem. Comm.* 2012, 48, 2415-2417
6. Jaeger, V.; Wilson, W.; Subramanian, V.* Photodegradation of methyl orange and 2,3-Butanedione on titanium-dioxide nanotube arrays efficiently synthesized on titanium coils. *Appl.Catal. B-Environ.* 2011,110, 6-13
7. Smith, Y.; Subramanian, V.* Heterostructural Composites of TiO₂ Mesh – TiO₂ Nanoparticles Photosensitized with CdS: A New Flexible Photoanode for Solar Cells. *J.Phys.Chem.C.* 2011, 115, 8376-8385.
8. Murugesan,S.; Myers, K.; Subramanian, V.* Amino-functionalized and acid treated multi-walled carbon nanotubes as supports for electrochemical oxidation of formic acid. *Appl.Catal. B-Environ.* 2011, 103,266-274.
9. Raja, K.S.; Smith, Y.R.; Kondamudi, N.; Manivannan, A.; Misra, M.; Subramanian, V.* CO₂ Photoreduction in the liquid phase over Pd-supported on TiO₂ nanotube and bismuth titanate Photocatalysts.*J. Electrochem. Solid State Lett.* 2011, 14, F5-F8.
10. Murugesan, S.; Smith, Y. R.; Subramanian, V.* Hydrothermal synthesis of Bi₁₂TiO₂₀ nanostructures using anodized TiO₂ nanotubes and its application in photovoltaics. *J. Phys. Chem. Lett.* 2010, 1, 1631-1636.
11. Murugesan, S.; Huda, M. N.; Yan, Y.; Al-Jassim, M. M.; Subramanian, V.* Band-engineered bismuth titanate pyrochlores for visible light photocatalysis. *J.Phys.Chem.C.* 2010, 114, 10598-10605.
12. Smith, Y.; Antony, A.R.; Subramanian, V.; Viswanathan, B.* Sulfated Fe₂O₃–TiO₂ synthesized from ilmenite ore: A visible light active photocatalyst. *Colloid Surface A.* 2010,367,140-147.
13. Antony, A.R.; Smith, Y.; Subramanian, V.; Viswanathan, B.* Structural studies of silica modified titania and its photocatalytic activity of 4-chlorophenol oxidation in aqueous medium. *Ind. J. Chem.-Sec. A,* 2010, 49, 867-875.
14. Kar, A.; Ryan, P.; Subramanian, V.* Photoelectrochemical responses of anodized titanium oxide films. *J. Mat. Res.* 2010, 25, 82-88.
15. Smith, Y.; Kar, A.; Subramanian, V.* Investigation of Physicochemical Parameters That Influence Photocatalytic Degradation of Methyl Orange over TiO₂ Nanotubes. *Ind. Eng. Chem. Res.* 2009, 48, 10268-10276.
16. Murugesan, S.; Subramanian, V.* Robust synthesis of bismuth titanate pyrochlore nanorods and its photocatalytic applications. *Chem. Comm.* 2009, 5109-5111.
17. Murugesan, S.; Subramanian, V.* Effects of acid accelerators on hydrogen generation from solid sodium borohydride using small scale devices. *J. Power Sources.* 2009, 187, 216-223.
18. Liu, Z.; Subramanian, V.; Misra, M. Vertically oriented TiO₂ nanotube arrays grown on Ti meshes for flexible dye-sensitized solar cells. *J.Phys.Chem.C.* 2009, 113, 14028-14033.

19. Kar, A.; Smith, Y. R.; Subramanian, V.* Improved Photocatalytic Degradation of Textile Dye Using Titanium Dioxide Nanotubes Formed Over Titanium Wires. *Environ. Sci. Technol.* 2009, 43, 3260-3265.
20. Sohn, Y.; Smith, Y.; Misra, M.; Subramanian, V.* Electrochemically assisted photocatalytic degradation of methyl orange using anodized titanium dioxide nanotubes. *Appl. Catal. B-Environ.* 2008, 84, 372-378.
21. Javed, U.; Subramanian, V.* Hydrogen generation using a borohydride-based semi-continuous milliscale reactor: Effects of physicochemical parameters on hydrogen yield. *Energy & Fuels.* 2008, 23, 408-413.
22. Venkatasubramanian, V.; Sankaran, M.; Viswanathan, B.*; Subramanian, V. Tungsten carbide as possible support for Pt in electrochemical reactions. *Bull. Catalysis Soc. India* 2008, 7, 146-152.
23. Subramanian, V.; Ndiege, N.; Seebauer, E. G.; Masel, R. I.* Synthesis and characterization of polyvinylpyrrolidone assisted tantalum pentoxide films. *Thin Solid Films,* 2008, 516, 4784-4792.
24. Subramanian, V.; Choi, J.; Seebauer, E. G.; Masel, R. I.* TiO₂-Al₂O₃ as a support for propane partial oxidation over Rh. *Catal. Lett.* 2007, 113, 13-18.
25. Ndiege, N.; Wilhoite, T.; Subramanian, V.; Shannon, M. A.; Masel, R. I.* Sol-gel synthesis of thick Ta₂O₅ films. *Chem. Mater.* 2007, 19, 3155-3161.
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Book chapters – UNR

37. (Invited) Vandavier, M.; Lee, S.; Viswanathan, B.; Subramanian, V.* Harvesting solar energy using inexpensive and benign materials; Ed: Chen, W.-Y.; Seiner, J.; Suzuki, T.; Lackner, M, Springer publications: Amsterdam 2012.
38. Smith, Y.; Subramanian, V.; Viswanathan, B.V.* Photo-electrochemical and Photocatalytic Conversion of Carbon Dioxide; *Chapter 9, in Photo-electrochemistry and photobiology for sustainability 1,217-242* Ed: S.Kaneco, B.Viswanathan and H Katsumata, Bentham Science publishers, India 2010.
39. (Invited) Kar, A.; Sohn, Y.; Subramanian, V.* Synthesis of Oxide Semiconductors, Metal Nanoparticles and Semiconductor-Metal Nanocomposites; Ed: Davide Cozzoli, Research Signpost: Trivandrum 2008.

Educational articles – UNR

1. (Chalkboard) Subramanian, V.* Nanostructured Semiconductor Composites for Solar Cells. *ECS Interface.* 2007, 16, 32-36.

Intellectual property – UNR

1. Robust synthesis of bismuth titanate pyrochlores using hydrothermal approach
US provisional patent # 61/333,463
2. Hydrothermal synthesis of bismuth titanate (Bi₁₂TiO₂₀) nanocubes for photovoltaic applications and solar energy conversion of CO₂ to fuels
US provisional patent#61/286,229
US full patent 2011/0155971, June 30, 2011

MEETING ABSTRACTS

- Subramanian, V., Kamat, P.V., ZnO nanostructures as smart materials for simultaneous detection and degradation of carboxylic acids , ACS (2005)
- Kamat, P.V. Sharma, S. Subramanian, V., Photoinduced charge separation and charge transfer in CdSe quantum dots. ACS (2004)
- Vinodgopal, K., Subramanian, V., Kamat, P.V., Incorporation of electroactive metal species in humic acid membranes ACS (2003)

SYNERGISTIC ACTIVITIES

- UNR Renewable Energy Center (2009-present)
 - Coordinating faculty for solar energy activities at UNR
[The team consists of faculty from Chemistry, Physics, and Engineering]
- Nevada Renewable Energy Consortium (NV-REC)

- Coordinating the efforts on solar energy research between faculty and researchers at UNR, DRI, and UNLV
- Sustainable energy Forum – multi-disciplinary undergraduate student forum on alternate energy at UNR
 - Founding faculty mentor (2008)
 - Advising faculty (2009-11)
- International student exchange for education and research
 - York Smith, intern for 6 months at Indian Institute of Technology, Chennai, India (2009)
[Collaborator: B. Viswanathan, National Center for Catalysis Research]
- Educational outreach activities:
 - Participant, University of Nevada, High School Summer camp (2009-present)
 - Participant, University of Nevada president initiative for mentoring Hug high school students (2008-10)
 - Participant, Educational outreach through Electrochemical Society, IEEE division (2009-current)
 - Member, several graduate student thesis committees in chemistry and engineering (2007-current)
 - Participant, Gifted and Talented Students program – This program identifies promising students interested in engineering education and offer them an opportunity to work in summer (2008-10)
 - Participant, Hispanic Society of Engineers (2007-08)

RESEARCH and EDUCATION COLLABORATORS

I have research and educational collaborations within Nevada, in the US, and also with organizations and institutions in Europe and Asia.