

Mohammad Al-Masum

Associate Professor, Department of Chemistry, Tennessee State University
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Education

Ph.D. Received in March 1996, "Palladium Catalyzed Hydrocarbonation of Allenes" with Professor Yoshinori Yamamoto from Tohoku University, Sendai, Japan

Post-Graduate. Received in September, 1991, "Claisen Approach to Asymmetric Synthesis of a Brefeldin C Intermediate" with Professor Takeshi Nakai from Tokyo Institute of Technology, Tokyo, Japan

M.Sc. (Thesis) Received in December, 1986, "The Preparation of Some Aromatic Ketones From The Reaction of Phenyl-Copper-Magnesium Reagent With Acyl Halides" with Professor M. T. Rahman from University of Dhaka, Dhaka, Bangladesh.

Professional Experience

Adjunct Faculty, 06,2013-08, 2013, Fisk University, TN; Adjunct Faculty, 06,2011-08, 2011, Fisk University, TN; Faculty, 06,2010-08, 2010, Fisk University, TN; Faculty, 06,2009-08, 2009, Fisk University, TN; Visiting Professor, 06,2006-08,2006, Vanderbilt University, TN; Research Faculty, 07, 2004-07, 2005, University of Tennessee, Knoxville, TN; Research Faculty, 08, 2002-07, 2004, University of Memphis, TN; Postdoctoral Fellow, 01, 2000-06, 2002, RTI International, RTP, NC; Visiting Professor, 07, 1998-12, 1999, Montana State University, MT; Assistant Professor, 04, 1996-03, 1998, Tohoku University, Japan; Lecturer, 08. 1988-03, 1993, Bangladesh University of Engg & Tech, Dhaka, Bangladesh

Award

2010 Faculty Development Award, Academic Affairs, TSU; 2008 Faculty Development Award, Academic Affairs, TSU; 2007 Faculty Research Award, Sponsored Research Program, TSU. Monbusho (Ministry of Education, Japan) Award: 1993-1996. 26th International UNESCO Fellowship, Tokyo Institute of Technology, Japan, 1990-1991

Teaching

Chem6408 Special Topic-Metal Catalyzed Cross-coupling Chemistry, Chem 5210 Advanced Organic Chemistry, Chem 5110 Graduate Organic Research, Chem 2020 Organic Chemistry II, 2010 Organic Chemistry I, Chem2021, Organic Chemistry Lab II, Chem2011, Organic Chemistry Lab I, , Chem 1030, General Chemistry I, Chem 1111, General Chemistry Lab I, Fall 2005-present, Tennessee State University (TSU)

Renovating Organic Chemistry Laboratory Curriculum, Fall 2005-present, TSU
Chem 3311, Organic Chemistry, Spring 2003, 2004, University of Memphis, TN

Mentor: Graduate and under-graduate students at TSU, 2005-present

Mentor: Post-doc, Graduate and Under-graduate students at Tohoku University, Sendai, Japan

Developing research laboratory for Post-graduate program and conducted several Chemistry courses, 1988-1993, Bangladesh University of Engineering & Technology, Dhaka, Bangladesh

Reviewer

Regularly reviewing manuscripts for the ACS journals, the American Chemical Society publications; Tetrahedron Letters, Elsevier Sciences.

Funding

Green chemistry based chemical research to assist with retention and success of underrepresented students, Title III, 2013. \$ 23,500.00 Funded

UR proposal for American Chemical Society: A Novel Route to Organonitrites by Pd-Catalyzed Cross-Coupling of Inorganic Nitrite Salts and Potassium Organotrifluoroborates, ACS PRF grants, \$ 65,000, Pending.

UR proposal for American Chemical Society: Potassium Organotrifluoroborates in Microwave Enhanced Carbonylation Reactions \$ 64,775.00 Reviewed, Not Funded

RUI(NSF 00-144): Reactions of Pronucleophiles with Potassium Organotrifluoroborates – New Look and Applications \$ 300,000 Reviewed, Not Funded

Funding Support: \$ 12,000.00 Research and Sponsored Program 2007 Faculty Award UR proposal for CCLI(NSF-09-529): Microwave Lab Station for Enhancing Instructional and Research Programs in Chemistry \$ 136,661.00 Reviewed,Not Funded

NSF CAREER proposal: Reactions of pronucleophiles with potassium organotrifluoroborates – New look and applications, \$ 499,865 Reviewed and Not Funded

Cottrell College Science Awards: Coupling Reactions Involving Potassium Organotrifluoroborates, Pronucleophiles and Transition Metal Catalyst, \$ 39,948 Reviewed and Not Funded

Patent

Al-Masum, M. (*E*)-Anethol synthesis by cross-coupling reaction of potassium allyltrifluoroborate and 4-bromoanisole, 2010 Application process is pending.

Recent Publications

1. A Novel Route to Organonitrites by Pd-Catalyzed Cross-Coupling of Sodium Nitrite and Potassium Organotrifluoroborates. **Al-Masum, M.**; Saleh, N.; Islam, T. *Tetrahedron Lett.* **2013**, *54*, 1141.
2. An efficient reaction process for the synthesis of oxazinanes and oxazolidines in the presence of air. **Al-Masum, M.**; Lott, B. W.; Ghazialsharif, N. *Int. J. Org. Chem.* **2012**, *2*, 362.
3. A New organic transformation by introducing crotyl/allyltrifluoroborates in cross-coupling reaction with aryl chlorides. **Al-Masum, M.**; Liu, K-Y. *Tetrahedron Lett.* **2011**, *52*, 5090.
4. Palladium-catalyzed direct cross-coupling of potassium styryltrifluoroborates and benzoyl chlorides—a one step method for chalcone synthesis. **Al-Masum, M.**; Ng, E.; Wai, M. *Tetrahedron Lett.* **2011**, *52*, 1008.
5. A Solvent Free C-Benzoylation and N-Benzoylation Reactions by Using Microwave Heating. **Al-Masum, M.**; Wai, M. C.; Dunnenberger, H. *Synthetic Commun.* **2011**, *41*, 2888.
6. Remarkable regioselectivity in microwave enhanced palladium catalyzed allylation reaction involving allyltrifluoroborates and aryl halides. **Al-Masum, M.**; Alam, S. *Tetrahedron Lett.* **2009**, *50*, 5201.
7. Students' categorizations of organic compounds: Daniel S. Domin, D. S.; **Al-Masum, M.**; Mensah, J. *Chem. Educ. Res. Pract.* **2008**, *9*, 114.
8. Microwave enhanced cross-coupling reactions of potassium alkenyltrifluoroborates and allyl acetates: A new method for 1,4-pentadiene synthesis. Kabalka, G. W.; **Al-Masum, M.** *Org. Lett.* **2006**, *8*, 11.
9. Microwave-enhanced cross-coupling of allyl chlorides with vinyltrifluoroborates. Kabalka, G. W.; Dadush, E.; **Al-Masum, M.** *Tetrahedron Lett.* **2006**, *47*, 7459.
10. Microwave enhanced cross-coupling reactions involving alkenyl- and alkynyltrifluoroborates. Kabalka, G. W.; **Al-Masum, M.** *Tetrahedron Lett.* **2006**, *47*, 1133.
11. Microwave enhanced cross-coupling reactions involving potassium organotrifluoroborates. Kabalka, G. W.; **Al-Masum, M.** *Tetrahedron Lett.* **2005**, *46*, 6329.
12. A new synthetic route to *P*-Chiral phosphine-boranes of high enantiopurity via stereocontrolled Pd(0)-Cu(I) cocatalyzed aromatic phosphorylation. **Al-Masum, M.**; Kumaraswamy, G.; Livinghouse, T. *J. Org. Chem.* **2000**, *65*, 4776.
13. Pd(0)-Cu(I) cocatalyzed phosphorylation of methylphenylphosphine-borane with aryl halides and aryl nonaflates. **Al-Masum, M.**; Livinghouse, T. *Tetrahedron Lett.* **1999**, *40*, 7731.
14. Palladium catalyzed hydrocarboxylation of allenes. **Al-Masum, M.**; Yamamoto, Y. *J. Am. Chem. Soc.* **1998**, *120*, 3809.
15. Palladium catalyzed hydrosulfination of allenes with tosylhydrazine leading to allylsulfones. Kamijo, S.; **Al-Masum, M.**; Yamamoto, Y. *Tetrahedron Lett.* **1998**, *39*, 691.
16. The two component palladium catalyst system for intermolecular hydroamination of allenes. **Al-Masum, M.**; Meguro, M.; Yamamoto, Y. *Tetrahedron Lett.* **1997**, *38*, 6071.
17. Palladium catalyzed alkylative dimerization between pronucleophiles and vinyltins. Nakamura, I.; Tsukada, N.; **Al-Masum, M.**; Yamamoto, Y. *J. Chem. Soc., Chem. Commun.* **1997**, 1583.
18. Palladium catalyzed γ -addition of pronucleophiles to allenylsulphides. Yamamoto, Y.; **Al-Masum, M.**; A. Takeda, *J. Chem. Soc., Chem. Commun.* **1996**, 831.
19. Palladium catalyzed addition-substitution reaction of pronucleophiles with allenylstannanes and propargylstannanes. Yamamoto, Y.; **Al-Masum, M.**; Fujiwara, N.; *J. Chem. Soc., Chem. Commun.* **1996**, 381.

20. Palladium catalyzed α -addition of certain pronucleophiles to alkoxyallenes. Yamamoto, Y.; **Al-Masum, M.** *synlett.* **1995**, 9, 969.
21. Remarkable reversal of the regioselectivity in the palladium catalyzed hydrocarbonation reaction of allenes with methylmalononitrile. Yamamoto, Y.; **Al-Masum, M.**; Fujiwara, N.; Asao, N. *Tetrahedron Lett.* **1995**, 36, 2811.
22. Palladium catalyzed addition of activated methylene and methyne compounds to allenes. Yamamoto, Y.; **Al-Masum, M.**; Asao, N. *J. Am. Chem. Soc.* **1994**, 116, 6019.
23. Regio- and stereocontrol in the reductive ring opening of the spirocyclic epoxide derived from the 4-siloxy-2-cyclopentenone. Tomooka, K.; Ishikawa, K.; **Al-Masum, M.**; Nakai, T. *synlett* **1993**, 9, 645.
24. Preparation of ketones via organocoppermagnesium reagents and acyl chlorides. Rahman, M. T.; Hai, A.K.M.A.; **Al-Masum, M.**; Nahar, S. K. *J. Bdesh. Chem. Soc.* **1989**, 2, 17.

Articles in conference proceedings

25. Saleh, N.; **Al-Masum, M.** Sodium Nitrite and Bismuth Nitrate are New Nitrite Sources in Pd-Catalyzed Cross-Coupling Chemistry for Organonitrite, 245th ACS National Meeting & Exposition - April 7-11, 2013, New Orleans, LA. ID # 18078
26. Yeasmin, S.; **Al-Masum, M.** Microwave irradiated Pd-catalyzed cross-coupling reaction of potassium organotrifluoroborates with carboxylic acid, 245th ACS National Meeting & Exposition - April 7-11, 2013, New Orleans, LA. ID # 22228
27. Islam, T.; Taylor, K.; **Al-Masum, M.** Microwave irradiated Pd-catalyzed direct aroylation reaction of aryltrifluoroborates with aroyl chloride, 245th ACS National Meeting & Exposition - April 7-11, 2013, New Orleans, LA. ID # 19339
28. **Al-Masum, M.**; Saleh, N.; Islam, T. Pd-catalyzed cross-coupling of organotrifluoroborates and nitrite to Organonitrites-A novel process 244th American Chemical Society National Meeting & Exposition, Philadelphia, PA, August 19-23, 2012. ID #11571
29. **Al-Masum, M.**; Saleh, N.; Liu, K.; Alam, S.; Wei, M.; Ng, E. Potassium organotrifluoroborates and their use in microwave irradiated Pd-catalyzed cross-coupling chemistry for C-C, C-N, C-O bond forming products. 122nd Tennessee Academy of Science annual meeting at Vanderbilt University, TN, Nov 16, 2012
30. **Al-Masum, M.**; Liu, K-Y.; Ng, E.; Wai, M.; Alam, S. New look of potassium allyltrifluoroborates in carbon-carbon and carbon-nitrogen bond formation reactions 242nd American Chemical Society National Meeting & Exposition, Denver, CO, August 28- September 1, 2011. ID # 17218
31. Liu, K-Y.; **Al-Masum, M.** Unprecedented cross coupling reaction of allyltrifluoroborate and benzoyl halides 240th American Chemical Society National Meeting & Exposition, Boston, MA, August 22-26, 2010, ID # 21799.
32. Ng, E.; Wai, M.; **Al-Masum, M.** Palladium-catalyzed microwave irradiated direct coupling of potassium arylvinyltrifluoroborates and benzoyl chlorides 240th American Chemical Society National Meeting & Exposition, Boston, MA, August 22-26, 2010, ID # 21801.
33. **Al-Masum, M.**; Ng, E. Palladium-catalyzed microwave irradiated cross-coupling reaction of potassium organotrifluoroborates and benzoyl halides 239th American Chemical Society National Meeting & Exposition, San Francisco, CA March 21-25, 2010, ID # 21493
34. **Al-Masum, M.**; Ng, E. Palladium-catalyzed microwave irradiated cross-coupling reactions for Chalcone synthesis, 30th Annual undergraduate research conference at Memphis, TN, March 7, 2010.
35. **Al-Masum, M.** Ghazialsharif, N. Catalyst free oxazolidine synthesis using aldehydes and ketones with 2-(methylamino) ethanol. Tennessee Academy of Science, Belmont University, April 18, 2009.
36. **Al-Masum, M.** Alam, S. Microwave irradiated palladium catalyzed cross-coupling reaction of potassium allyltrifluoroborates and organic halides. 237th ACS National Meeting & Exposition, Salt Lake City, UT, United States, March 22-27, 2009 Abstract ID # 12555472.
37. **Al-Masum, M.** Discovery chemistry by undergraduate and master's level students at Tennessee State University. 118th meeting of Tennessee Academy of Science, Nashville, TN, United States, November 20-22, 2008.
38. **Al-Masum, M.**; Alam, S.; Wai, M. Microwave irradiated palladium catalyzed cross-coupling reaction of potassium allyltrifluoroborates and organic Halides. Abstracts, 60th Southeast

Regional Meeting of the American Chemical Society, Nashville, TN, United States, November 12-15 (2008).

39. **Al-Masum, M.**; Dunnenberger, H. Synthesis of ketones from potassium organotrifluoroborates and benzoyl bromide/chloride. 235th ACS national Meeting & Exposition. New Orleans, LA, April 6-11, 2008, Abstract ID # 1170081.
40. **Al-Masum, M.**; Wai, M; Dunnenberger, H. A New Look of AlCl₃ in Microwave Irradiated Solvent Free Benzoylation Reaction. Abstracts, 60th Southeast Regional Meeting of the American Chemical Society, Nashville, TN, United States, November 12-15, 2008.
41. **Al-Masum, M.** Pd-catalyzed coupling of C-H activated compounds with potassium organotrifluoroborates. Gordon Research Conferences, ORGANIC REACTIONS & PROCESSES, July 13-18, 2008, Bryant University, Smithfield, RI Abstract ID # 1828559.
42. **Al-Masum, M.** Unprecedented cross-coupling of potassium vinyltrifluoroborates and allyl acetates in the presence of palladium catalyst. 5th International Microwave in Chemistry Conference, Imperial College, London, UK, April 18-20, 2007.
43. **Al-Masum, M.**; Akther, J. Microwave enhanced amination reactions involving dihalocompounds. Abstract, 233rd ACS National Meeting, Chicago, IL, March 25-28, 2007, Abstract ID# 1032809.
44. **Al-Masum, M.** Microwave enhanced palladium catalyzed cross-coupling reactions involving organotrifluoroborates. Abstract of papers, 4th International Microwaves in Chemistry Conference, Orlando, FL, March 8-11, 2006.
45. Kabalka, G. W.; **Al-Masum, M.** Microwave-enhanced cross-coupling reactions involving potassium organotrifluoroborates. Abstract of papers, ACS National Meeting, Washington, DC, August 28 - September 1, 2005.
46. **Al-Masum, M.**; Burkey, Theodore J. Bismuth oxide: A new catalyst for oxazolidine synthesis under mild conditions. Abstracts of papers, 228th ACS National Meeting, Philadelphia, PA, United States, August 22-26, 2004.
47. **Al-Masum, M.**; Burkey, Theodore J. Synthesis of side chain derivatives of cyclopentadienyl manganese tricarbonyl and benzene chromium tricarbonyl. Abstracts of Papers, 226th ACS National Meeting, New York, NY, United States, September 7-11, 2003 (2003).
48. Burkey, Ted; To, Tung T.; Duke, Charles B., III; **Al-Masum, M.** Photochromic properties of manganese and chromium complexes undergoing chelate ring closure and linkage isomerization. Abstracts of Papers, 225th ACS National Meeting, New Orleans, LA, United States, March 23-27, 2003 (2003).
49. Nice, L. E.; **Al-Masum, M.**; Narske, R. M.; Thomas, B. F.; Seltzman, H. H. Conformationally constrained anandamide analogs as probes of the cannabinoid receptors, Abstracts of Papers, 10th annual international cannabinoid research society meeting, Hunt Valley, MD, June, 2000.
50. **Al-Masum, M.**; Yamamoto, Yoshinori. Palladium catalyzed hydrocarboxylation of allenes. Abstracts of Papers, The Fifth International symposium on carbanion chemistry, Sendai, Japan, August, 1998.
51. **Al-Masum, M.**; Dunnenberger, H. Synthesis of ketone from potassium organotrifluoroborates and benzoyl bromide/chloride. 235th ACS National Meeting & Exposition, New Orleans, Louisiana, April 6-10, 2008. Abstract ID # 1170081.
52. **Al-Masum, M.**; Yamamoto, Yoshinori. Palladium catalyzed hydrocarboxylation of allenes. Abstracts of Papers, International conference on synthetic organic chemistry at Kyoto, Japan, July, 1997.
53. **Al-Masum, M.** Many of the works have appeared in the Japan Chemical Society annual meeting abstracts in the years (1994 - 1997).
54. **Al-Masum, M.** More than 50 (fifty) research abstracts have been presented in Tennessee State University campus wide symposium and Chemistry day symposium (2006-2013)

Professional Developments (Workshops, Training)

1. NSF-HBCU faculty workshop for HBCU institutions, New Orleans, LA, January 24, 2011.
2. 2011 TBR Research Development Symposium, Nashville, TN, March 25, 2011.
3. NSF sponsored QEM network workshop on Information and proposal development for the NSF proposals, Baltimore, MD. January 14-15, 2011
4. Customer Service Training—'I AM TSU', at TSU, 2011

5. NSF sponsored Quality Education for Minorities (QEM) network workshop for NSF's CAREER Program. New Orleans, LA. February 27-28, 2009
6. NSF sponsored Quality Education for Minorities (QEM) network workshop for NSF's Major Research Instrumentation (MRI) Program. Baltimore, MD. October 27-28, 2006
7. NSF sponsored Quality Education for Minorities (QEM) network workshop for NSF's CAREER Program. Memphis, TN. February 10-11, 2006
8. Customer Service Training—'I AM TSU', at TSU, April 14, 2009
9. Effective Management of Student Conduct at TSU, December 10, 2008
10. Banner Training in 2008

Invited Speaker

East Tennessee State University, Johnson City, TN, Nov 2012,
 Middle Tennessee State University, Nashville, TN, Sept, 2011
 Fisk University, Nashville, TN
 LeMoyne-Owen College, Memphis, TN
 University of Dhaka, Dhaka, Bangladesh
 Bangladesh University of Engineering & Technology (BUET), Dhaka, Bangladesh

Other Activities

Chair: Organic session, 244th ACS National Meeting & Exposition, Philadelphia, PA, 2012
Faculty Senate: Tennessee State University since 2007
Chair: Organic session, 237th ACS National Meeting & Exposition, Salt Lake City, UT, 2009
Member: Graduate Committee, Chemistry Department, TSU
Member: Graduate Instrumentation Committee, Chemistry Department, TSU
Member: Text Book Adoption Committee, Chemistry Department, TSU

Participant: TSU Annual Community Service Day in 2007 and 2009
 Judge Tennessee Academy of Science 2010 meeting
 K to 12 Class: voluntary science laboratory class at Head magnet middle school at Nashville, TN
Recruitment: Introduced TSU Chemistry program at Middle Tennessee State University, Nashville, TN; Fisk University, Nashville, TN ; LeMoyne-Owen College, Memphis and University of Dhaka, Dhaka, Bangladesh, BUET, Dhaka, Bangladesh
President: Bangladesh Association of Nashville, 2009
Biography for Inclusion: **Who's Who in America 2014** (68th Edition)
Biography for Inclusion: **Who's Who in America 2011** (65th Edition)