

## ANTHONY J. ARDUENGO, III

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**Born** Tampa, Florida, U.S.A.; 1952  
**Ancestry** Spanish  
**Citizenship** United States of America  
**Languages** English (mother tongue), German (fluent), Latin  
**Education** Bouldercrest & Meadowview Elementary School; Atlanta, Georgia  
Walker High School; Atlanta, Georgia  
B.S., Chemistry (*cum laude*), Georgia Institute of Technology, 1974  
Ph.D., Chemistry, Georgia Institute of Technology, 1976



### Professional Experience

2015-present co-Founder and North American Organizer for *STANCE – TECHNOLOGY FOR A SUSTAINABLE CHEMICAL ECONOMY*

2013-present Founder and CEO, Innovative Valency, LLC.

1999-present *Saxon Professor of Chemistry*, The University of Alabama

1999-present Adjunct Professor of Chemistry, Technische Universität Carolo - Wilhelmina

1984-1998 Research Staff, Research Leader, and Research Fellow, E. I. du Pont de Nemours & Co., Central Research and Development Dept.

1977-1984 Assistant Professor of Chemistry, University of Illinois – Urbana

1976-1977 Research Staff, E. I. du Pont de Nemours & Co., Central Research and Development Dept.

### Professional Societies and Selected Honors:

- Member of the American Chemical Society  
Member of Gesellschaft Deutscher Chemiker
- Member of Sigma Xi
- Member of the Editorial Board of the *Journal of Heteroatom Chemistry*, 1990-present
- Member of the Editorial Board of *Chemical Reviews*, 1991-2006
- Member of IUPAC, Commission on Inorganic Nomenclature, 1990-1995
- Alexander von Humboldt Senior Research Prize, 1996
- 1996 Gold Medal for "Excellence in Main Group Chemistry Research," The International Council on Main Group Chemistry
- Chute Lectureship, Dalhousie Univ., October 1999
- Fellow - American Association for the Advancement of Science
- Humboldtian on Campus for the Alexander von Humboldt Foundation
- Charles Knight Lectureship Univ. of Akron 2013
- Alexander von Humboldt "Wiedereinladung" 2014
- Special Guest Professorship – Johannes Gutenberg Universität Mainz 2015 & 2016

### Research Interests and Outreach Activities:

Professor Arduengo's interests are material science in nature and lie at the interface of organic, and inorganic chemistry. Activities focus on the chemistry of new or unusual bonding arrangements, catalyst development, and sustainable chemistry. Accomplishments include (1) the first planar T-shaped, 10-electron 3-coordinate bonding arrangement at phosphorus, (2) the edge

inversion process, (3) the first stable examples of several important classes of ylides such as carbonyl, chloronium ylides, and nitrile ylides, (4) the first synthesis and structural characterization of a stable carbene, (5) the first stable, structurally characterized, imidazolin-2-ylidene carbene, (6) the first isolated and structurally characterized thiazol-2-ylidene carbene, and (7) a commercial polyimide film (Kapton<sup>®</sup>-ZT). For the last several years Professor Arduengo has participated as a member of international programs in order to foster student exchanges and international outreach opportunities. These activities include participation in Japanese-American Core-to-Core program. In Germany, Arduengo hosts study abroad experiences for University of Alabama students to study at various German universities during the Spring Semesters. Professor Arduengo holds instruction in a number of chemistry courses and German language allowing participating U.S. undergraduate students to obtain a study-abroad experience while remaining on track for their degree date. Professor Arduengo is a co-founder and North American coordinator of the STANCE consortium (Technology for a Sustainable Chemical Economy).

**Ten Highest-Cited Publications - § with Post-doctoral; \* with Ph.D. Candidate; # with undergraduate researcher) {nr. of citations}:**

35. "A stable crystalline carbene" Arduengo, Anthony J., III; Harlow, Richard L.; Kline, Michael J. *Am. Chem. Soc.* **1991**, *113(1)*, 361-3. DOI:10.1021/ja00001a054 {3119}
79. "Looking for Stable Carbenes: The Difficulty in Starting Anew" Arduengo, Anthony J., III *Acc. Chem. Res.* **1999**, *32(11)*, 913-921. DOI:10.1021/ar980126p {1149}
48. §"Electronic stabilization of nucleophilic carbenes" Arduengo, Anthony J., III; Dias, H. V. Rasika; Harlow, Richard L.; Kline, Michael J. *Am. Chem. Soc.* **1992**, *114(14)*, 5530-4. DOI:10.1021/ja00040a007 {1047}
67. §"A stable diaminocarbene" Arduengo, Anthony J., III; Goerlich, Jens R.; Marshall, William J. *J. Am. Chem. Soc.* **1995**, *117(44)*, 11027-8. DOI:10.1021/ja00149a034 {448}
52. "Homoleptic carbene-silver(I) and carbene-copper(I) complexes" Arduengo, Anthony J., III; Dias, H. V. Rasika; Calabrese, Joseph C.; Davidson, Fredric *Organometallics* **1993**, *12(9)*, 3405-9. DOI:10.1021/om00033a009 {348}
59. "Photoelectron Spectroscopy of a Carbene/Silylene/Germylene Series" Arduengo, Anthony J., III; Bock, Hans; Chen, Han; Denk, Michael; Dixon, David A.; Green, Jennifer C.; Herrmann, Wolfgang A.; Jones, Nancy L.; Wagner, Matthias; West, Robert J. *Am. Chem. Soc.* **1994**, *116(15)*, 6641-9. DOI:10.1021/ja00094a020 {308}
74. "An Air Stable Carbene and Mixed Carbene 'Dimers'" Arduengo, Anthony J., III; Davidson, Frederic; Dias, H. V. R.; Goerlich, Jens R.; Khasnis, Dilip; Marshall, William J.; Prakasha, T. K. *J. Am. Chem. Soc.* **1997**, *119(52)*, 12742-12749. DOI:10.1021/JA973241O {273}
6. \*"An electrically neutral  $\sigma$ -sulfuranyl radical from the homolysis of a perester with neighboring sulfenyl sulfur: 9-S-3 species" Perkins, C. W.; Martin, J. C.; Arduengo, A. J.; Lau, W.; Alegria, A.; Kochi, J. K. *J. Am. Chem. Soc.* **1980**, *102(26)*, 7753-9. DOI:10.1021/ja00546a019 {261}
54. §"Low-Coordinate Carbene Complexes of Nickel(0) and Platinum(0)" Arduengo, Anthony J., III; Gamper, Siegfried F.; Calabrese, Joseph C.; Davidson, Fredric *J. Am. Chem. Soc.* **1994**, *116(10)*, 4391-4. DOI:10.1021/ja00089a029 {241}
75. \*"Auf der Suche nach stabilen Carbenen" Arduengo, Anthony J., III; Krafczyk, Roland *Chem. Uns. Zeit* **1998**, *32(1)*, 6-14. DOI:10.1002/ciuz.19980320103 {208}

**Thesis/Dissertation Advisor:** Prof. E. M. Burgess

**Dissertation:** "The synthesis, structure and chemistry of substituent-perturbed thione S-methylides and S,S-dihalothiones" 1976, Georgia Institute of Technology

**Collaborators:** Prof. D.A. Dixon (UA), R.T. Baker (Ottawa), Prof. T. S. Snowden (UA), Dr. Owen W. Webster (Retired DuPont) Prof. M. Yoshifuji (Retired Sendai University), Prof. M. Tamm (TU-

Braunschweig), Prof. Rainer Streubel (Uni-Bonn), Prof. Guy Bertrand (UC-San Diego), Prof. Y. Yamamoto (Hiroshima Univ.), Prof. Jason Bara (UA), Prof. Yosuke Uchiyama (Kitasato Univ., Tokyo), Prof. Till Opatz (Johannes Gutenberg-Universität, Mainz).

### ***Undergraduate, Graduate and Post-graduate Advisees***

*Undergraduate Students (33 total):* Gregory B. Ames (U. of Ill.), Thomas E. Stumpf (U. of Ill.), Robert L. Burger, Jr. (U. of Ill.), Thomas D. Paloumpis, (U. of Ill.), Eric K. Eisenhart (U. of Ill.), Daniel C. Alter (U. of Ill.), Brian L. Benac (U. of Ill.), Mark B. Mizen (U. of Ill.), G. Peyton Wood, Jr. (U. of Ill.), Julia Cooper (U. of Ala.), Geoffery Hudson (U. of Alabama), Uriah Kilgore, (U. of Ala.), Michael Phillips (U. of Ala.), Keith Bentley (U. of Ala.), Joshua Dolphin (U. of Ala.), Ashley Hunter (U. of Ala.), Andrew Huddleston (U. of Alabama), Clay Owens (U. of Ala.), Joseph Nelson (U. of Ala.), David Dorn (U. of Ala.), Nick Bartel (U. of Ala.), Stephan Osborn (U. of Ala.), Minni Lahoti (U. of Ala.), Sarah McFann (U. of Ala.), Matthew Studer (U. of Ala.), Tristan McGinnis U. of Ala.), Felix Pfitzner (JGU-Mainz), Qyang Chen (U. of Ala.), Dzung Nguyen (Uni. Marburg), Constantin Krauß (Uni. Erlangen), Lisa Kammer (JGU-Mainz), Matthias Krumb (JGU-Mainz), Joseph Sprauer (U. of Ala.), Austin Permann (U. of Ala.)

*Graduate Students (23 total):* S. D. Harper (Univ of Ill.), A. Bashir Hashemi (Univ of Ill.), E. P. Janulis (Univ of Ill.), S. A. Culley (Univ of Ill.), D. H. Champion (Univ of Ill.), C. F. Palmer (Univ of Ill.), R. Krafczyk (TU-Braunschweig), W. Li (Univ. of Ala.), Y-H. Kim (Univ of Ala.), D. Tapu (Univ. of Ala), G. Gurau (Univ. of Ala.), L. Iconaru (Univ. of Ala.), M. Vasiliu (Univ. of Ala.), A. Cojocar (Univ. of Ala.), J. Runyon (Univ. of Ala.), N. Enweani (Univ. of Ala.), Endre Mihaly (Univ. of Ala.), David Frempong (Univ. of Ala.), Stephan Pusch (Uni. Mainz), Christian Otto (TU Clausthal), Sven Arenz (Uni. Köln), Christine Knaapke (Uni. Köln). Lilli Duan (Uni. Bonn).

*Post-doctoral Advisees (23 total):* K. Srinivasachar (Univ. of Ill.), C. A. Stewart (du Pont), M. Lattman (du Pont), G. Bettermann (du Pont), W. Bublak (du Pont), J. Breker (du Pont), H. V. Rasika Dias (du Pont), S. Gamper (du Pont), M. Tamm (du Pont), D. Khasnis (du Pont), T. K. Prakasha (du Pont), J. R. Goerlich (du Pont), M. Unverzagt, (du Pont), A. Jockisch, (Univ. of Ala.), T. P. Bannenberg (Univ of Ala.), Shiro Matsukawa (Univ. of Ala.), C. Schiel (Univ. of Ala.), O. Kühl (Univ. of Ala.), C. Vasam (Univ. of Ala.), J. W. Runyon, (Univ. of Ala.) A. Dreger (Univ. of Ala.), M. Bode (Univ. of Ala.), A. Hildebrand (Univ. of Ala.)

## Anthony J. Arduengo, III Publications(135) and Patents(17) {Citations as of January 2017}

### Publications

135. "An Asymmetric One-Pot Synthesis of (3R, 3aS, 6aR)-Hexahydrofuro [2, 3-b] furan-3-ol: A Key Component of Current HIV Protease Inhibitors" Sevenich, Adrian; Liu, Gong-Qing; Arduengo III, Anthony J.; Gupton, B. Frank; Opatz, Till *J. Org. Chem.*, **2017**, *82*(2), 1218–1223. DOI:10.1021/acs.joc.6b02588 {1}
134. "Backbone Phosphoramidate-Functionalized Imidazol-2-ylidene Complexes" Majhi, Paresh K.; Schnakenburg, Gregor; Arduengo III, Anthony J.; Streubel, Rainer *Aust. J. Chem.* **2016**, *69*(10), 1186–1192. DOI:10.1071/CH16132 {1}
133. "Xylochemie – Ein Beitrag zur Nachhaltigen Chemischen Synthese" Opatz, Till; Arduengo, Anthony J., III *GIT Labor-Fachzeitschrift*, February 28, 2016, <http://www.git-labor.de/forschung/umwelt/xylochemie-ein-beitrag-zur-nachhaltigen-chemischen-synthese>. (English Translation of Author Accepted Manuscript: <https://xylochemistry.com/portal/Documents/Xylochemistry-GIT-En-AM.pdf>) {3}
132. "Reactions of Imidazol(in)-2-ylidenes with electron deficient Fluoroolefins" Arduengo, Anthony J., III; Calabrese, Joseph C.; Dias, H. V. Rasika; Davidson, Fredric; Goerlich, Jens R.; Jockisch, Alexander; Kline, Michael; Marshall, William J.; Runyon, Jason W. *Phosphorus, Sulfur, Silicon, and the related Elements*, **2016**, *191*(3), 527-534. DOI:10.1080/10426507.2015.1094659 {2}
131. "Xylochemistry-Making Natural Products Entirely from Wood" Stubba, Daniel; Lahm, Günther; Geffe, Mario; Runyon, Jason W.; Arduengo, Anthony J., III; Opatz, Till *Angew. Chem., Int. Ed.* **2015**, *54*(47), 14187-14189. DOI:10.1002/anie.201508500 {4}
130. "Imidazol-2-ylidene Reactivity towards Cyanocarbons" Arduengo, Anthony J., III; Calabrese, Joseph C.; Marshall, William J.; Runyon, Jason W.; Schiel, Christian; Schinnen, Christoph; Tamm, Matthias; Uchiyama, Yosuke" *Z. Anorg. Allge. Chem.* **2015**, *641*(12-13), 2190-2198. DOI:10.1002/zaac.201500578 {2}
129. "Synthesis and oxidative desulfurization of P(V)-functionalized imidazole-2-thiones: easy access to P-functional ionic liquids" Majhi, Paresh Kumar; Schnakenburg, Gregor; Arduengo, Anthony J.; Streubel, Rainer *Aust. J. Chem.* **2015**, *68*(8), 1282-1292. DOI:10.1071/CH14726 {4}
128. "Role of Electronegative Substituents on the Bond Energies in the Grubbs Metathesis Catalysts for M = Fe, Ru, Os" Vasiliu, Monica; Arduengo, Anthony J.; Dixon, David A. *J. Phys. Chem. C* **2014**, *118*(25), 13563-13577. DOI:10.1021/jp500472p {11}
127. "The zwitterionic structure of the parent amidinium tetrazolide and a rare tetrazole ring-opening reaction" Uchiyama, Yosuke; Dolphin, Joshua S.; Harlow, Richard L.; Marshall, William J.; Arduengo, Anthony J., III *Aust. J. Chem.* **2014**, *67*(3), 405-410. DOI:10.1071/CH13460 {2}
126. "Electronic structure predictions of the properties of non-innocent P-ligands in group 6B transition metal complexes" Garner, Edward B., III; Arduengo, Anthony J., III; Streubel, Rainer; Dixon, David A. *Dalton Trans.* **2014**, *43*(5), 2069-2078. DOI:10.1039/c3dt52056k
125. "Synthesis of highly substituted 2-<sup>13</sup>C-imidazolium salts and metal NHC complexes for the investigation of electronic unsymmetry by NMR" Emsermann, Jens; Arduengo, Anthony J., III; Opatz, Till *Synthesis* **2013**, *45*(16), 2251-2264. DOI:10.1055/s-0033-1338496 {2}
124. "Fused Spirocyclic Imidazolone Ketals" Arduengo, Anthony J.; Gurau, Gabriela; Kelley, Steven P.; Marshall, William J.; Runyon, Jason W. *Angew. Chem., Int. Ed.* **2013**, *52*(41), 10871-10873. DOI:10.1002/anie.201305714 {3}
123. "Synthesis and first complexes of C4/5 P-bifunctional imidazole-2-thiones" Majhi, Paresh Kumar; Sauerbrey, Susanne; Leiendecker, Alexander; Schnakenburg, Gregor; Arduengo, Anthony J., III; Streubel, Rainer *Dalton Trans.* **2013**, *42*(36), 13126-13136. DOI:10.1039/c3dt51557e {12}
122. "Synthesis and complexes of fluoroalkoxy carbenes" Arduengo, Anthony J., III; Dolphin, Joshua S.; Gurau, Gabriela; Marshall, William J.; Nelson, Joseph C.; Petrov, Viacheslav A.; Runyon, Jason W. *Angew. Chem., Int. Ed.* **2013**, *52*(19),

- 5110-5114. DOI:10.1002/anie.201301503 {16}
121. "Computational Studies of the Properties of Azole-xBH<sub>3</sub> Adducts for Chemical Hydrogen Storage Systems" Vasiliu, Monica; Arduengo, Anthony J.; Dixon, David A. *J. Phys. Chem. C* **2012**, *116(42)*, 22196-22211. DOI:10.1021/jp306600c {3}
120. "Synthesis of Backbone P-Functionalized Imidazol-2-ylidene Complexes: En Route to Novel Functional Ionic Liquids" Majhi, Paresh Kumar; Sauerbrey, Susanne; Schnakenburg, Gregor; Arduengo, Anthony J.; Streubel, Rainer *Inorg. Chem.* **2012**, *51(19)*, 10408-10416. DOI:10.1021/ic301641z {24}
119. "Synthesis of bis(imidazole-2-thion-4-yl)phosphanes" Sauerbrey, Susanne; Majhi, Paresh Kumar; Schwieger, Sebastian; Arduengo, Anthony J., III; Streubel, Rainer *Heteroatom Chem.* **2012**, *23(6)*, 513-519. DOI:10.1002/hc.21043 {7}
118. "Synthesis, structure and reactivity of 4-phosphanylated 1,3-dialkyl-imidazole-2-thiones" Sauerbrey, Susanne; Majhi, Paresh Kumar; Schnakenburg, Gregor; Arduengo, Anthony J., III; Streubel, Rainer Dalton Trans. **2012**, *41(17)*, 5368-5376. DOI:10.1039/c2dt12483a {24}
117. "On the dual role of N-heterocyclic carbenes as bases and nucleophiles in reactions with organic halides" Knappe, Christiane E. I.; Arduengo, Anthony J., III; Jiao, Haijun; Neudoerfl, Joerg-Martin; von Wangelin, Axel Jacobi *Synthesis* **2011**, *23*, 3784-3795. DOI:10.1055/s-0031-1289593 {29}
116. "Synthesis of Stabilized Phosphinidenoid Complexes Using Weakly Coordinating Cations" Duan, Lili; Nesterov, Vitaly; Runyon, Jason W.; Schnakenburg, Gregor; Arduengo, Anthony J., III; Streubel, Rainer *Aust. J. Chem.* **2011**, *64(12)*, 1583-1586. DOI:10.1071/CH11325 {6}
115. "Carbene-Based Lewis Pairs for Hydrogen Activation" Runyon, Jason W.; Steinhof, Oliver; Dias, H. V. Rasika; Calabrese, Joseph C.; Marshall, William J.; Arduengo, Anthony J. *Aust. J. Chem.* **2011**, *64(8)*, 1165-1172. DOI:10.1071/CH11246 {28}
114. "N-Heterocyclic Carbenes" Arduengo, Anthony J. *Aust. J. Chem.* **2011**, *64(8)*, 1106-1108. DOI:10.1071/CH11249 {3}
113. "Intensive NMR study of 1-t-butyl-3-methyl-2,4-bis(2,4,6-tri-t-butylphenyl)-1,3-diphosphacyclobutane-2,4-diyl" Yoshifuji, Masaaki; Osborn, Stefan T.; Arduengo, Anthony J.; Belmore, Kenneth A.; Ito, Shigekazu *Heteroatom Chem.* **2011**, *22(3-4)*, 331-338. DOI:10.1002/hc.20684 {4}
112. "Bond Energies in Models of the Schrock Metathesis Catalyst" Vasiliu, Monica; Li, Shenggang; Arduengo, Anthony J.; Dixon, David A. *J. Phys. Chem. C* **2011**, *115(24)*, 12106-12120. DOI:10.1021/jp202668p {10}
111. "Modeling the Direct Activation of Dihydrogen by a P<sub>2</sub>C<sub>2</sub>-Cyclic Biradical: Formation of a Cyclic Bis(P-H λ<sup>5</sup>-phosphorane)" Ito, Shigekazu; Miura, Joji; Morita, Noboru; Yoshifuji, Masaaki; Arduengo, Anthony J. *Phosphorus, Sulfur and Silicon and the related Elements* **2011**, *186(4)*, 754-755. DOI:10.1080/10426507.2010.518182
110. "Diverse Reactions of Sterically Protected 1,3-Diphosphacyclobutane-2,4-diyls with Hydride" Ito, Shigekazu; Miura, Joji; Morita, Noboru; Yoshifuji, Masaaki; Arduengo, Anthony J., III *Phosphorus, Sulfur and Silicon and the related Elements* **2011**, *186(4)*, 756-757. DOI:10.1080/10426507.2010.518181
109. "NMR Studies of 1-tert-Butyl-3-methyl-2,4-bis(2,4,6-tri-tert-butylphenyl)-1,3-diphosphacyclobutane-2,4-diyl" Yoshifuji, Masaaki; Osborn, Stefan T.; Arduengo, Anthony J.; Belmore, Kenneth A.; Ito, Shigekazu *Phosphorus, Sulfur and Silicon and the related Elements* **2011**, *186(4)*, 845-846. DOI:10.1080/10426507.2010.518183 {1}
108. "When sterics overcome electronics: an unusual haptotropic P→N pentacarbonyl tungsten shift" Helten, Holger; Schnakenburg, Gregor; Daniels, Joerg; Arduengo, Anthony J., III; Streubel, Rainer *Organometallics* **2011**, *30(1)*, 84-91. DOI:10.1021/om1007709 {3}
107. "Synthesis and physicochemical properties of stable 1,3-diphosphacyclobutane-2,4-diyls bearing sulfanyl groups" Ito, Shigekazu; Miura, Joji; Morita, Noboru; Yoshifuji, Masaaki; Arduengo, Anthony J., III *Comptes Rendus Chimie* **2010**, *13(8-9)*, 1180-1184. DOI:10.1016/j.crci.2010.04.007 {6}
106. "Synthesis and properties of oligo(biradicals) composed of 1,3-diphosphacyclobutane-2,4-diyl units and benzyl-type

- linkers” Ito, Shigekazu; Miura, Joji; Morita, Noboru; Yoshifuji, Masaaki; Arduengo, Anthony J., III *Heteroatom Chem.* **2010**, *21(6)*, 404-411. DOI:10.1002/hc.20625 {10}
105. “Diverse reactions of sterically-protected 1,3-diphosphacyclobutane-2,4-diyls with hydride” Ito, Shigekazu; Miura, Joji; Morita, Noboru; Yoshifuji, Masaaki; Arduengo, Anthony J., III *Dalton Trans.* **2010**, *39(35)*, 8281-8287. DOI:10.1039/c0dt00532k {10}
104. “Fused polycyclic nucleophilic carbenes - synthesis, structure, and function” Arduengo, Anthony J., III; Iconaru, Luigi I. *Dalton Trans.* **2009**, *35*, 6903-6914. DOI:10.1039/b907211j {53}
103. “Carbenes Introduction” Arduengo, Anthony J.; Bertrand, Guy *Chem. Rev. (Washington, DC, United States)* **2009**, *109(8)*, 3209-3210. DOI:10.1021/cr900241h {80}
102. “Modeling the Direct Activation of Dihydrogen by a P<sub>2</sub>C<sub>2</sub> Cyclic Biradical: Formation of a Cyclic Bis(P-H λ5-phosphorane)” Ito, Shigekazu; Miura, Joji; Morita, Noboru; Yoshifuji, Masaaki; Arduengo, Anthony J., III *Inorg. Chem.* **2009**, *48(17)*, 8063-8065. DOI:10.1021/ic901072z {13}
101. “Catenation of 1,3-diphosphacyclobutane-2,4-diyl units having 2,4,6-tri-tert-butylphenyl protecting groups and a P-sec-butyl group in the ring” Ito, Shigekazu; Miura, Joji; Morita, Noboru; Yoshifuji, Masaaki; Arduengo, Anthony J., III *Z. Anorg. Allge. Chem.* **2009**, *635(3)*, 488-495. DOI:10.1002/zaac.200801265 {10}
100. “Diammoniosilane: Computational Prediction of the Thermodynamic Properties of a Potential Chemical Hydrogen Storage System” Grant, Daniel J.; Arduengo, Anthony J.; Dixon, David A. *J. Phys. Chem. A* **2009**, *113(4)*, 750-755. DOI:10.1021/jp807870w {5}
99. “Poly(biradicals): oligomers of 1,3-diphosphacyclobutane-2,4-diyl units” Ito, Shigekazu; Miura, Joji; Morita, Noboru; Yoshifuji, Masaaki; Arduengo, Anthony J., III *Angew. Chem., Int. Ed.* **2008**, *47(34)*, 6418-6421. DOI:10.1002/anie.200801461 {25}
98. “Studies on stable 1,3-diphosphacyclobutane-2,4-diyls” Yoshifuji, Masaaki; Arduengo, Anthony J., III; Ito, Shigekazu *Phosphorus, Sulfur and Silicon and the related Elements* **2008**, *183(2-3)*, 335-339. DOI:10.1080/10426500701734588 {2}
97. “Oxidation of 1,3-diphosphacyclobutane-2,4-diyl with ammonium antimonate and EPR study of the corresponding cation radical” Yoshifuji, Masaaki; Arduengo, Anthony J., III; Konovalova, Tatyana A.; Kispert, Lowell D.; Kikuchi, Manabu; Ito, Shigekazu *Chem. Let.* **2006**, *35(10)*, 1136-1137. DOI:10.1246/cl.2006.1136 {21}
96. “The Heats of Formation of Diazene, Hydrazine, N<sub>2</sub>H<sub>3</sub><sup>+</sup>, N<sub>2</sub>H<sub>5</sub><sup>+</sup>, N<sub>2</sub>H, and N<sub>2</sub>H<sub>3</sub> and the Methyl Derivatives CH<sub>3</sub>NNH, CH<sub>3</sub>NNCH<sub>3</sub>, and CH<sub>3</sub>HNNHCH<sub>3</sub>” Matus, Myrna H.; Arduengo, Anthony J., III; Dixon, David A. *J. Phys. Chem. A* **2006**, *110(33)*, 10116-10121. DOI:10.1021/jp061854u {36}
95. Preparation and characterization of an air-tolerant 1,3-diphosphacyclobuten-4-yl radical” Ito, Shigekazu; Kikuchi, Manabu; Yoshifuji, Masaaki; Arduengo, Anthony J., III; Konovalova, Tatyana A.; Kispert, Lowell D. *Angew. Chem., Int. Ed.* **2006**, *45(26)*, 4341-4345. DOI:10.1002/anie.200600950 {36}
94. “Reaction of tetramethylimidazol-2-ylidene with (Tp<sup>t</sup>Bu,Me)YbE(thf) (E = I, CH<sub>2</sub>SiMe<sub>3</sub>): simple adduct and a hydrocarbyl tethered carbene ligand” Ferrence, Gregory M.; Arduengo, Anthony J.; Jockisch, Alexander; Kim, Hyo-Joong; McDonald, Robert; Takats, Josef *J. Alloys Comp.* **2006**, *418(1-2)*, 184-188. DOI:10.1016/j.jallcom.2005.09.091 {13}
93. “Accurate Heats of Formation of the “Arduengo-Type” Carbene and Various Adducts Including H<sub>2</sub> from ab Initio Molecular Orbital Theory” Dixon, David A.; Arduengo, Anthony J., III *J. Phys. Chem. A* **2006**, *110(5)*, 1968-1974. DOI:10.1021/jp055527i {41}
92. “The generation of a metallocene-fused imidazol-2-ylidene and its mercury complex” Arduengo, Anthony J., III; Tapu, Daniela; Marshall, William J. *Angew. Chem., Int. Ed.* **2005**, *44(44)*, 7240-7244. DOI:10.1002/anie.200502814 {28}
91. “A Bimetallic Complex Containing a Cyclopentadienyl-Annulated Imidazol-2-ylidene” Arduengo, Anthony J., III; Tapu, Daniela; Marshall, William J. *J. Am. Chem. Soc.* **2005**, *127(47)*, 16400-16401. DOI:10.1021/ja055565f {41}
90. “A zwitterionic cyclopentadienyl annulated imidazolium salt” Arduengo, Anthony J.; Bannenberg, Thomas P.; Tapu,

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