

## DAFTAR PUSTAKA

- Abdullah, M., Mohamed, N., & Ismail, Z. H. (2007). The effect of microscale chemistry experimentation on students' attitude and motivation towards chemistry practical work. *Journal of Science and Mathematics Education in Southeast Asia*, 30(2), 44-72.
- Abrahams, I., & Millar, R. (2008). Does practical work really work? A study of the effectiveness of practical work as a teaching and learning method in school science. *International Journal of Science Education*, 30(14), 1945-1969.
- Abrahams, I., Reiss, M. J., & Sharpe, R. M. (2013). The assessment of practical work in school science. *Studies in Science Education*, 49(2), 209-251.
- Acharry, S., & Suwannathada, J. (2010). The development of microscale laboratory: Titration. *International Journal of Arts And Sciences*, 3(9), 296-305.
- Afrida, W. S., & Purwanti, I. (2016). Pengembangan kit praktikum dan lembar kegiatan peserta didik (LKPD) materi laju reaksi untuk siswa sma. *Prosiding Semirata 2015 BKN PTN Barat*. 418-414.
- Albert, D. R., Todt, M. A., & Davis, H. F. (2012). A low-cost quantitative absorption spectrophotometer. *Journal of Chemical Education*, 89(11), 1432-1435.
- Anza, M., Bibiso, M., Mohammad, A., & Kuma, B. (2016). Assessment of factors influencing practical work in chemistry: a case of secondary schools in wolaita zone, Ethiopia, *I.J. Education and Management Engineering*, 6(1), 53-63.
- Arifin, M. (1995). *Pengembangan Program Pengajaran Bidang Studi Kimia*. Surabaya : Universitas Airlangga.
- Arifin, M. (2000). *Strategi Belajar Mengajar*. Bandung: Jurusan Pendidikan Kimia FMIPA UPI.
- Arikunto, S. (2010). *Prosedur Penelitian Suatu Pendekatan Praktik*. Jakarta: PT. Rineka Cipta.
- Azwar, S. (2010). *Metode Penelitian*. Yogyakarta: Pustaka Pelajar.
- Badan Standar Nasional Pendidikan. (2014). *Penilaian Buku Teks Pelajaran Kimia Untuk Siswa SMA/MA*. Jakarta: Kementerian Pendidikan Nasional.
- Barke, H. D., & Engida, T. (2001). Structural chemistry and spatial ability in different cultures. *Chemistry Education Research and Practice*, 2(3), 227-239.
- Batubara, R. (2013). *Pengaruh Strategi Pembelajaran Berbasis Masalah (Problem Based Learning) dengan Media Peta Konsep Untuk Meningkatkan Hasil Belajar Kimia Siswa Pada Materi Pokok Laju Reaksi*. Tesis. Unimed. Medan.

- Becker, N., Stanford, C., Towns, M., & Cole, R. (2015). Translating across macroscopic, submicroscopic, and symbolic levels: the role of instructor facilitation in an inquiry-oriented physical chemistry class. *Chemistry Education Research and Practice*, 16(4), 769-785.
- Bradley, J. D. (1999). Hands-on practical chemistry for all. *Pure and applied chemistry*, 71(5), 817-823.
- \_\_\_\_\_. (2016). Achieving the aims of school practical work with microchemistry. *African Journal of Chemical Education*, 6(1), 2-16.
- Campbell, T. & Bohn, C. (2008). Science laboratory experiences of high school students across one state in the u.s. Descriptive research from the classroom. *Science Educator*, 17(1): 36-44.
- Carin, A. A. (1997). *Teaching Science Through Discovery*. Upper Saddle River: Prentice Hall.
- Celik, S. (2014). Chemical literacy levels of science and mathematics teacher candidates. *Australian Journal of Teacher Education*, 39(1), 1-15.
- Chang, R. (2005). *Kimia Dasar Konsep-Konsep Inti Edisi Ketiga (Jilid 2)*. Jakarta: Erlangga.
- Cheung\*, D., & Yip, D. Y. (2004). How science teachers' concerns about school-based assessment of practical work vary with time: the Hong Kong experience. *Research in Science & Technological Education*, 22(2), 153-169.
- Chittleborough, G., & Treagust, D. (2008). Correct interpretation of chemical diagrams requires transforming from one level of representation to another. *Research in science education*, 38(4), 463-482.
- Damayanti, N. P. S. (2017). Pengembangan Panduan Praktikum Kimia Kelas X SMA Semester II Berbasis Inkuiiri Terbimbing Berdasarkan Kurikulum 2013. *UNESA Journal of Chemical Education*, 6(1). 1-7.
- Darsana, I. W., Sadia, I. W., Tika, I. N., & Si, M. (2014). Analisis Standar Kebutuhan Laboratorium Kimia dalam Implementasi Kurikulum 2013 Di SMA Negeri Kabupaten Bangli. *Jurnal Pendidikan IPA Indonesia*, 4(1).
- Davidowitz, B., & Chittleborough, G. (2009). Linking the macroscopic and sub-microscopic levels: Diagrams. *Multiple Representations In Chemical Education*, 4, 169-191.
- Djamarah S.B. & Zein, (2002). *Strategi Belajar Mengajar*. Jakarta : Rineka Cipta.
- Doppelt, Y. (2009). Assessing creative thinking in design-based learning. *International Journal of Technology and Design Education*, 19(1), 55-65.
- Eggen, P. O., & Kvittingen, L. (2004). A small-scale and low-cost apparatus for the electrolysis of water. *J. Chem. Educ*, 81(9), 1337.

- Eko. (2010). Penggunaan Bahan Kimia Rumah Tangga untuk Eksperimen Kimia (Sebagai Alternatif Praktikum Kimia di SMA). *Jurnal Program Studi Kimia UNY*, 2(2).
- Emiliya, R., (2015), Pengembangan Penuntun Praktikum Model Discovery dan Project Based Learning pada Pembelajaran Asam dan Basa di SMA Kelas XI, *Jurnal Tabularasa PPs Unimed*, 12(3), 294-304.
- Fadzil, H. M., & Saat, R. M. (2013). Phenomenographic study of students' manipulative skills during transition from primary to secondary school. *Sains Humanika*, 63(2), 71-75.
- Fadzil, H. M., & Saat, R. M. (2017). Exploring students' acquisition of manipulative skills during science practical work. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(8), 4591-4607.
- Gall, M. D., Borg, W. R., & Gall, J. P. (1996). *Educational Research: An Introduction*. London : Longman Publishing.
- Gilbert, J. K., & Treagust, D. F. (2009). Towards a coherent model for macro, submicro and symbolic representations in chemical education. *Multiple representations in chemical education*, 333-350.
- Hanson, R. (2014). Using small scale chemistry equipment for the study of some organic chemistry topics-a case study in an undergraduate class in Ghana. *Small*, 5(18).
- Hanson, R., & Acquah, S. (2014). Enhancing concept understanding through the use of micro chemistry equipment and collaborative activities. *Journal of Education and Practice*, 5(12), 120-130.
- Hanum, A.Y. 2014. *Pengembangan Penunutun Praktikum Kimia Inovatif Untuk SMA/MA Kelas XII Sesuai Kurikulum 2013*. Tesis. Medan: Pascasarjana Universitas Negeri Medan
- Hicks, R.W. & Holly M. Bevsek. 2012. Utilizing problem-based learning in qualitative analysis lab experiments. *Journal Chemical Education*, 89: 254-257.
- Hofstein, A. (2004). The laboratory in chemistry education: Thirty years of experience with developments, implementation, and research. *Chemistry Education Research and Practice*, 5(3), 247-264.
- Hofstein, A. (2017). The Role of Laboratory in Science Teaching and Learning. Dalam Taber, K. S., & Akpan, B. (Eds.). *Science Education: An International Course Companion*. (pp. 357-368). New York : Springer.
- Hofstein, A., & Lunetta, V. N. (2004). The laboratory in science education: Foundations for the twenty-first century. *Science education*, 88(1), 28-54.
- Hofstein, A., & Mamlok-Naaman, R. (2007). The laboratory in science education: the state of the art. *Chemistry education research and practice*, 8(2), 105-107.

- Imaniarta, I., Sulistina, O & Yahmin., (2013). Pengembangan Buku Petunjuk Praktikum Kimia SMA berbasis Inkuiri Terbimbing Pada Materi Laju Reaksi dan Kesetimbangan Kimia. *Jurnal Pendidikan Kimia UM*. 2(2).
- Irby, S. M., Phu, A. L., Borda, E. J., Haskell, T. R., Steed, N., & Meyer, Z. (2016). Use of a card sort task to assess students' ability to coordinate three levels of representation in chemistry. *Chemistry Education Research and Practice*, 17(2), 337-352.
- Isjoni., (2009), *Pembelajaran Kooperatif*, Pustaka Pelajar : Yogyakarta.
- Ismail, Z. H., & Jusoh, I. (2001). Relationship between science process skills and logical thinking abilities of Malaysian students. *Journal Of Science And Mathematics Education In Southeast Asia*, 24(2), 67-77.
- Jamaluddin, J., Kade, A., & Nurjannah, N. (2015). Analisis Pelaksanaan Praktikum Menggunakan Kit IPA Fisika Di SMP Se-Kecamatan Sojol Kabupaten Donggala. *Jurnal Pendidikan Fisika Tadulako Online (JPFT)*, 3(1). 6-9
- Jenkins, E. W. (2000). Constructivism in school science education: Powerful model or the most dangerous intellectual tendency?. *Science & Education*, 9(6), 599-610.
- Jorgensen, M.W & Philips L.J., (2007). *Analisis Wacana Teori dan Metode*. Yogyakarta: Pustaka Pelajar.
- Kelkar, S. L., & Dhavale, D. D. (2000). Microscale experiments in chemistry—The need of the new millennium. *Resonance*, 5(10), 24-31.
- Kemdikbud. (2011). *Pedoman Pembuatan Alat Peraga Kimia Sederhana untuk SMA*. Jakarta : Kementerian Pendidikan dan Kebudayaan.
- Kemdikbud. (2014). Implementasi Kurikulum 2013. Jakarta : Kementerian Pendidikan dan Kebudayaan.
- Mafumiko, F. M. (2008). The potential of micro-scale chemistry experimentation in enhancing teaching and learning of secondary chemistry: experiences from tanzania classrooms. *NUE Journal of International Cooperation*, 3, 63-79.
- Mahaffy, P. (2015). Chemistry education and human activity. *Chemistry education: best practices, opportunities and trends*. Dalam E. S Torregrosa, & J. G Martine (Eds). *Chemistry Education: Best Practices, Opportunities, and Trends* (hal 3-26). Weinheim : Wiley-VCH.
- Mamlok-Naaman, R., & Barnea, N. (2012). Laboratory Activities in Israel. *Eurasia Journal of Mathematics, Science & Technology Education*, 8(1). 49-57.
- Mansilla, V. B., Jackson, A., & Jacobs, H. (2013). Educating for global competence: Learning redefined for an interconnected world. *Mastering Global Literacy* (5-27). New York : Solution Tree.
- Mardhiya, J., Silaban, R., & Mahmud., (2017), Analysis of Chemistry Laboratory Implementation in Senior High School, Proceedings of the 2<sup>nd</sup> Annual

- International Seminar on Transformative Education and Educational Leadership, Medan.
- Marzano, R. J. (2007). *The art and science of teaching: A comprehensive framework for effective instruction.* ASCD.
- Mulyasa, E. (2014). *Guru dalam Implementasi Kurikulum 2013.* Bandung: Remaja Rosdakarya.
- Mulyono. 2005. Pengembangan dan Implementasi Model Praktikum Kimia Berbasis Lingkungan Tempat Tinggal Siswa pada SMU di Bandung. *Jurnal Pengajaran MIPA*, 6 (1):77-78.
- Murphy, M., Redding, S., & Twyman, J. (Eds.). (2014). *The Handbook on Innovations in Learning.* IAP.
- Napitupulu, E., Situmorang, J., & Mursyid, R., (2014). The instructional model development based on interactive multimedia on technical mechanics competence of vocational high school students of north sumatera province. *International Journal of Education and Research*,. 2(8), 1-9.
- National Microscale Chemistry Center, (2002), What is Microscale Chemistry? <http://www.microscale.org/about.asp> diakses 30 Oktober 2017.
- Padmo, D. 2004. *Teknologi Pembelajaran: Peningkatan Kualitas Belajar Melalui Teknologi Pembelajaran.* Ciputat: Pusat Teknologi Komunikasi dan Informasi Pendidikan.
- Petrucci, R. H., Harwood, W. S., Herring, F. G., & Madura, J. D. (2007). Kimia Dasar Prinsip-prinsip dan Aplikasi Modern Edisi Kesembilan Jilid 3. Jakarta: Erlangga
- Purba, F.J., Muchtar, Z., & Silaban, R. (2015), Pengembangan Penuntun Praktikum Kimia SMA Kelas XI Materi Laju Reaksi Sesuai dengan Model Pembelajaran Penemuan dan Berbasis Proyek, *Jurnal Penelitian Bidang Pendidikan*, 21(1): 21-28.
- Rahayu, P., Mulyani, S., & Miswadi, S.S. (2012). Pengembangan Pembelajaran IPA Terpadu dengan Menggunakan Model Pembelajaran Problem Based melalui *Lesson Study*. *Jurnal Pendidikan IPA Indonesia*, 1(1): 63-70.
- Reid, N., & Shah, I. (2007). The role of laboratory work in university chemistry. *Chemistry Education Research and Practice*, 8(2), 172-185.
- Ridwan. (2007). *Skala Pengukuran Variabel-variabel Penelitian.* Bandung: Alfabeta.
- Rusdi, A., (2008). *Model Pengembangan Perangkat Pembelajaran.* Surabaya: Pustaka Ilmu.
- Rusdianawati, D & Sukarmin. (2017). Pengembangan Kit Praktikum Sebagai Media Pembelajaran untuk Melatihkan Keterampilan Proses Sains Berbasis Inkuiri pada Materi Kesetimbangan Kimia Kelas XI. *UNESA Journal of Chemical Education*. 6(2): 308-314.

- Saifudin, A., (2010), *Upaya Meningkatkan Hasil Belajar Kimia Siswa Dengan Menggunakan Model Pembelajaran Problem Based Learning (PBL)*, <http://repository.library.uinsyah.edu/> (Diakses tanggal 09 Februari 2018).
- Santyasa, I. W. (2007). *Model-Model Pembelajaran Inovatif*. Universitas Pendidikan Ganesha : Buleleng.
- Sastrika, I. A. K., Sadia, W., & Muderawan, I. W. (2013). Pengaruh Model Pembelajaran Berbasis Proyek Terhadap Pemahaman Konsep Kimia dan Keterampilan Berpikir Kritis. *Jurnal Pendidikan IPA*, 3(1).
- Sari, D. N., Lzelwati, N., & Eliwatis, E. (2014). Pengembangan Alat Peraga Praktikum Sederhana dan Modul Penuntun Praktikum Untuk Materi Listrik Dinamis Pada Pelajaran Fisika Kelas X SMA. *Edusainstika*, 1(1). 18-20.
- Sattsangi, P. D. (2010). A microscale approach to chemical kinetics in the general chemistry laboratory: The Potassium Iodide Hydrogen Peroxide Iodine-Clock reaction. *Journal of Chemical Education*, 88(2), 184-188.
- Schunk, D.S. (2012). *Learning Theories : An educational perspective*. (E. Hamdiah & R. Fajar, Trans). Yogyakarta : Pustaka Pelajar.
- Schwitzow, M., Zimmerman, C., Croker, S., & Härtig, H. (2016). What students learn from hands-on activities. *Journal of research in science teaching*, 53(7), 980-1002.
- Stevens, D. D., & Levi, A. (2005). Leveling the field: Using Rubrics to achieve greater equity in teaching and grading. *Essays on Teaching Excellence*, 17(1), 1-4.
- Subamia, I. D. P., Wahyuni, I. S., & Widiasih, N. N. (2014). Pengembangan Kit IPA Berorientasi Lingkungan Penunjang Praktikum Pada Pembelajaran IPA Sesuai Kurikulum 2013 Di SMPN 2 Singaraja. In *Prosiding Seminar Nasional MIPA*. 239-249.
- Sudrajat, A. (2013). *Pengembangan Perangkat Asesmen Kompetensi Praktikum Kimia Analitik Dasar Berbasis Task With Student Direction (TWS) Bagi Mahasiswa Calon Guru*. Disertasi. Universitas Pendidikan Indonesia.
- Sugiyono. (2012). *Metode Penelitian Kuantitatif, Kualitatif, dan R & D*. Bandung: Alfabeta.
- Sukaesih, S. (2011). Analisis Sikap Ilmiah dan Tanggapan Mahasiswa Terhadap Penerapan Model Pembelajaran Berbasis Praktikum. *Jurnal penelitian pendidikan*, 28(1).
- Suparman, A. (2014). *Desain Instruksional Modern*. Jakarta: Erlangga.
- Suparno, P. (2001). *Teori Perkembangan Kognitif Jean Piaget*. Kanisius: Jakarta.
- Taber, K. S. (2013). Three levels of chemistry educational research. *Chemistry Education Research and Practice*, 14(2), 151-155.

- Talanquer, V. (2011). Macro, submicro, and symbolic: the many faces of the chemistry “triplet”. *International Journal of Science Education*, 33(2), 179-195.
- Tawil, M., & Liliyasa. (2014). *Keterampilan – Keterampilan Sains dan Implementasinya dalam Pembelajaran IPA*. Makassar: Badan Penerbit UNM.
- Tesfamariam, G. M., Lykknes, A., & Kvittingen, L. (2017). ‘Named small but doing great’: an investigation of small-scale chemistry experimentation for effective undergraduate practical work. *International Journal of Science and Mathematics Education*, 15(3), 393-410.
- Thiagarajan, S., Semmel, D., & Semmel, M. (1974). *Instructional Development for Training Teachers of Exceptional Children: Sourcebook*. Minneapolis: University of Minnesota.
- Thompson, J., & Soyibo, K. (2002). Effects of lecture, teacher demonstrations, discussion and practical work on 10th graders' attitudes to chemistry and understanding of electrolysis. *Research in Science & Technological Education*, 20(1), 25-37.
- Trianto, M. P. (2010). *Model Pembelajaran Terpadu*. Jakarta: Bumi Aksara.
- Utami, R. R., Cahyono, E., & Supardi, K. I. (2017). Pengembangan Kit Hukum-Hukum Dasar Kimia untuk Meningkatkan Pencapaian Kompetensi Siswa melalui Pendekatan Ilmiah. *Journal of Innovative Science Education*, 6(1), 28-39.
- Yani, A.F. (2015). *Pengembangan Penuntun Praktikum Kimia SMA Kelas XI pada Materi Hidrolisis Garam Sesuai Model Pembelajaran Penemuan dan Berbasis Proyek*. Tesis. Medan: Pascasarjana Universitas Negeri Medan.
- Yulia, R.H. (2016). *Pengembangan Penuntun Praktikum Kimia yang Inovatif Pada Pokok Bahasan Senyawa Karbon di Kelas XII SMA/MA*. Tesis. Medan: Pascasarjana Universitas Negeri Medan.
- Yunita, W., Cahyono, E., & Wijayati, N. (2016). Pengembangan Kit Stoikiometri Untuk Meningkatkan Pemahaman Konsep Siswa Melalui Pembelajaran Scientific Approach. *Journal of Innovative Science Education*, 5(1), 63-72.
- Zakaria, Z., Latip, J., & Tantayanon, S. (2012). Organic chemistry practices for undergraduates using a small lab kit. *Procedia-Social and Behavioral Sciences*, 59, 508-514.
- Zakiah, (2015), Pengembangan Penuntun Praktikum Tipe Discovery dan Project Based Learning pada Pembelajaran Larutan Elektrolit dan Nonelektrolit di SMA, *Jurnal Pendidikan Kimia*, 83-94.