NASTAVNO – NAUČNOM VEĆU
TEHNOLOŠKO-METALURŠKOG FAKULTETA
UNIVERZITETA U BEOGRADU

Na sednici Nastavno-naučnog veća Tehnološko-metalurškog fakulteta u Beogradu održanoj 30.11.2017. godine imenovani smo u Komisiju za podnošenje izveštaja o ispunjenosti uslova za izbor kandidata Branislava Todića, doktora tehničkih nauka-oblast hemija i hemijsko inženjerstvo u zvanje NAUČNI SARADNIK.

Na osnovu pregleda i analize dostavljenog materijala i uvida u dosadašnji rad dr Branislava Todića, podnosimo sledeći

IZVEŠTAJ

1.1 BIOGRAFSKI PODACI

Branislav Todić je rođen 21.10.1987. godine u Sremskoj Mitrovici, gde je završio osnovnu i srednju školu. Na Tehnološko-metalurški fakultet (TMF), Univerziteta u Beogradu, upisao se školske 2006/2007. godine, na odsek za Hemijsko inženjerstvo. Osnovne studije je završio u septembru 2010. godine sa prosečnom ocenom 9,34. Master studije TMF-a (smer Hemijsko procesno inženjerstvo) završio je u avgustu 2011. godine sa prosečnom ocenom 9,50 i ocenom 10 za master rad sa temom „Analiza GTL – Fišer-Tropšovog procesa dobijanja tečnih ugljovodonika iz prirodnog gasa" kod mentora prof. Dr Dejana Skale. Školske 2011/12. godine upisao je doktorske studije na Tehnološko-metalurškom fakultetu, studijski program Hemijsko inženjerstvo, pod rukovodstvom prof. dr Nikole Nikačevića, vanrednog profesora TMF-a. Doktorsku disertaciju sa temom „Modelovanje hemijske kinetike i optimizacija reaktora sa pakovanim slojem za Fišer-Tropš sintezu" odbranio je 18. septembra 2015. godine.

1.2. NAUČNO-ISTRAŽIVAČKI RAD

Od septembra 2011. do marta 2014. bio je istraživač na međunarodnom projektu "Kinetika Fišer-Tropš sinteze sa suspendovanim kobaltnim katalizatorima" (eng. "Kinetics of Slurry Phase Fischer-Tropsch Synthesis on a Cobalt Catalyst") u okviru Texas A&M Univerziteta u Kataru. Učestvovao je u izradi predloga međunarodnog istraživačkog projekta "Modelovanje, optimizacija i dinamička analiza reaktora sa pakovanim slojem i mili-struktuiranih reaktora za Fišer-Tropš sintezu" (eng. "Modeling, optimization and dynamic analysis of fixed bed and milli-structured reactors for Fischer-Tropsch synthesis"), u saradnji Tehnološko-metalurškog fakulteta Univerziteta u Beogradu i Teksas A&M Univerziteta u Kataru, koji je nagrađen od strane Katarskog Nacionalnog Istraživačkog Fonda u maju 2014. Branislav Todić je trenutno zaposlen kao naučni saradnik (eng. Assistant Research Scientist) na Katedri za hemijsko inženjerstvo Teksas A&M Univerziteta u Kataru.

Dr Branislav Todić je autor 4 naučna rada u izuzetnim međunarodnim časopisima (M21a), 7 radova u vrhunskim međunarodnim časopisima (M21), jednog poglavlja u monografiji

međunarodnog značaja (M14), jednog rada saopštenog na skupu međunarodnog značaja štampanog u celini (M33) i 26 radova saopštenih na skupovima međunarodnog značaja štampanih u izvodu.

2. SPISAK NAUČNIH RADOVA KANDIDATA

2.1 POGLAVLJA U MONOGRAFIJAMA I TEMATSKIM ZBORNICIMA – M10

2.1.1. Poglavlja u monografijama međunarodnog značaja - M14:

2.1.1. Ma W., Graham U.M., Jacobs G., Todic B., Bukur D.B. and Davis B.H., "Fischer-Tropsch synthesis: effect of CO conversion on product selectivities during deactivation or by changing space velocity at stable conditions over unpromoted and Ru promoted 25%Co/Al_2O_3 catalysts", in Chemical Industries vol. 142, "Fischer-Tropsch Synthesis, Catalysts and Catalysis: Advances and Applications", Eds. Davis B.H. and Occelli M.L., Taylor & Francis, Boca Raton, **2016**, 31-42., ISBN: 978-1-4665-5529-7.

2.2. RADOVI U NAUČNIM ČASOPISIMA MEĐUNARODNOG ZNAČAJA – M20

2.2.1. Radovi u međunarodnim časopisima izuzetnih vrednosti - M21a:

2.2.1.1. Todic B., Nowicki L., Nikacevic N. and Bukur D.B., "Fischer–Tropsch synthesis product selectivity over an industrial iron-based catalyst: Effect of process conditions", Catalysis Today, **2016**, 261, 28-39. (IF = 4.636, ISSN: 0920-5861)

2.2.1.2. Bukur D.B., Todic B. and Elbashir N.O., "Role of Water-Gas-Shift Reaction in Fischer-Tropsch Synthesis on Iron Catalysts: A Review", *Catalysis Today*, **2016**, 275, 66-75. (IF = 4.636, ISSN: 0920-5861)

2.2.1.3. Todic B., Ma W., Jacobs G., Davis B.H., Bukur D.B., "Effect of process conditions on the product distribution of Fischer–Tropsch synthesis over a Re-promoted cobalt-alumina catalyst using a stirred tank slurry reactor", *Journal of Catalysis*, **2014**, 311, 325-338. (IF = 6.921, ISSN: 0021-9517)

2.2.1.4. Todic B., Ma W., Jacobs G., Davis B.H., Bukur D.B., "CO-insertion mechanism based kinetic model of the Fischer–Tropsch synthesis reaction over Re-promoted Co catalyst", *Catalysis Today*, **2014**, 228, 32-39. (IF = 3.893, ISSN: 0920-5861)

2.2.2. Radovi objavljeni u vrhunskim međunarodnim časopisima - M21:

2.2.2.1. Stamenić M., Dikić V., Mandić M., Todić B., Bukur D. B. and Nikačević N., "Multiscale and multiphase model of fixed bed reactors for Fischer–Tropsch Synthesis: Intensification possibilities study", *Industrial & Engineering Chemistry Research*, **2017**, 56 (36), 9964-9979. (IF(2016) = 2.843, ISSN: 1520-5045)

2.2.2.2. Mandic M., Todic B., Zivanic Lj., Nikacevic N. and Bukur D.B., "Effects of Catalyst Activity, Particle Size and Shape, and Process Conditions on Catalyst Effectiveness and Methane

Selectivity for Fischer–Tropsch Reaction: A Modeling Study", *Industrial and Engineering Chemistry Research*, **2017**, 56 (10), 2733-2745. (IF(2016) = 2.843, ISSN: 1520-5045)

2.2.2.3. Todic B., Ordomsky V.V., Nikacevic N.M., Khodakov A.Y. and Bukur D.B., "Opportunities for intensification of Fischer–Tropsch synthesis through reduced formation of methane over cobalt catalysts in microreactors", Catalysis Science & Technology, **2015**, 5, 1400-1411. (IF = 5.287, ISSN: 2044-4761)

2.2.2.4. Olewski T., Todic B., Nowicki L., Nikacevic N. and Bukur D.B., "Hydrocarbon selectivity models for iron-based Fischer–Tropsch catalyst", Chemical Engineering Research and Design, **2015**, 95, 1-11. (IF = 2.525, ISSN: 0263-8762)

2.2.2.5. Jacobs G., Ma W., Gao P., Todic B., Bhatelia T., Bukur D.B., Khalid S., Davis B.H., "The application of synchrotron methods in characterizing iron and cobalt Fischer–Tropsch synthesis catalysts", *Catalysis Today*, **2013**, 214, 100-139. (IF = 3.309, ISSN: 0920-5861)

2.2.2.6. Todic B., Bhatelia T., Froment G.F., Ma W., Jacobs G., Davis B.H., Bukur D.B., "Kinetic Model of Fischer−Tropsch Synthesis in a Slurry Reactor on Co−Re/Al_2O_3 Catalyst", *Industrial and Engineering Chemistry Research*, **2013**, 52, 669-679. (IF = 2.235, ISSN: 1520-5045)

2.2.2.7. Jacobs G., Ma W., Gao P., Todic B., Bhatelia T., Bukur D.B., Khalid S., Davis B.H., "Fischer-Tropsch synthesis: differences observed in local atomic structure and selectivity with Pd compared to typical promoters (Pt, Re, Ru) of Co/Al_2O_3 catalysts", *Topics in Catalysis*, **2012**, 55, 811-817. (IF = 2.608, ISSN: 1572-9028)

2.3. ZBORNICI MEĐUNARODNIH NAUČNIH SKUPOVA – M30

2.3.1. Saopštenje sa međunarodnog skupa štampano u celini - M33:

2.3.1.1. Todic B., Olewski T., Nikacevic N., Bukur D.B., "Modeling of Fischer-Tropsch product distribution over Fe-based catalyst", *Chemical Engineering Transactions*, **2013**, 32, 793-798. (ISBN 978-88-95608-23-5; ISSN: 1974-9791)

2.3.2. Saopštenje sa međunarodnog skupa štampano u izvodu - M34:

2.3.2.1. Nikacevic N., Dikic V., Mandic M., Todic B., Bukur D.B. and Petkovska M., "Dynamic analysis of intensified millimetre-scale fixed bed reactor for Fisher-Tropsch synthesis", 10th World Congress of Chemical Engineering, October 1-5, 2017, Barcelona, Spain

2.3.2.2. Dikic V., Stamenic M., Mandic M., Todic B., Bukur D.B. and Nikacevic N., "Optimisation of a fixed bed reactor for Fischer-Tropsch synthesis", 10th World Congress of Chemical Engineering, October 1-5, 2017, Barcelona, Spain

2.3.2.3. Todic B., Mandic M., Nikacevic N. and Bukur D.B., "Heat generation and removal in Fixed-bed reactors for Fischer-Tropsch Synthesis", AIChE 2017 Annual Meeting, October 29 – November 3, 2017, Minneapolis, US

2.3.2.4. Todic B., Mandic M., Nikacevic N. and Bukur D.B., "Influence of process parameters on heat generation and removal in fixed bed reactors for Fischer-Tropsch synthesis", 13th International Conference on Gas–Liquid and Gas–Liquid–Solid Reactor Engineering, August 20-23, 2017, Brussels, Belgium

2.3.2.5. Stamenic M., Dikic V., Mandic M., Todic B., Bukur D.B. and Nikacevic N., "Fischer-Tropsch synthesis in conventional and milli- fixed-bed reactors: a modeling study", 13th International Conference on Gas–Liquid and Gas–Liquid–Solid Reactor Engineering, August 20-23, 2017, Brussels, Belgium

2.3.2.6. Bukur D.B., Todic B., Mandic M., Nikacevic N., "Modeling of diffusion resistances for cobalt-based catalyst particles in Fischer-Tropsch Synthesis", 13th European Congress on Catalysis, August 27-31, 2017, Florence, Italy

2.3.2.7. Todic B., Nikacevic N., Bukur D.B., "Kinetics of methane formation and 1-olefin hydrogenation in Fischer-Tropsch synthesis over cobalt catalyst", 11th Natural Gas Conversion Symposium, June 5-9, 2016, Tromso, Norway.

2.3.2.8. Zivanic Lj., Todic B., Nikacevic N., Bukur D.B., "3D model of a single catalyst particle for the Fischer-Tropsch Synthesis: Influence of process conditions and particle shape and size on the catalyst effectiveness", 11th Natural Gas Conversion Symposium, June 5-9, 2016, Tromso, Norway.

2.3.2.9. Stamenic M., Mandic M., Todic B., Nikacevic N., Bukur D.B., "A 1D-heterogeneous model with detailed kinetics of Fischer-Tropsch synthesis in a Fixed-Bed Reactor", 11th Natural Gas Conversion Symposium, June 5-9, 2016, Tromso, Norway.

2.3.2.10. Mandic M., Todic B., Zivanic Lj., Nikacevic N., Bukur D.B., "Modelling of diffusion-reaction interaction inside the Co-based catalyst particles for the Fischer-Tropsch Synthesis", AIChE Annual Meeting, November 13-18, 2016, San Francisco, US.

2.3.2.11. Todic B. and Bukur D.B., "Kinetic modeling of primary and secondary reactions in Fischer-Tropsch synthesis", 251th ACS National Meeting, March 13-17, 2016, San Diego, US.

2.3.2.12. Todic B., Nikacevic N., Bukur D.B., "Optimization of a fixed bed reactor for Fischer-Tropsch synthesis using detailed kinetic model", 10th European Congress of Chemical Engineering, September 27–October 1, 2015, Nice, France.

2.3.2.13. Ma W., Graham U.M., Jacobs G., Todic B., Bukur D.B. and Davis B.H., "Fischer-Tropsch synthesis: Effect of CO conversion on product selectivities during deactivation by oxidation or by changing space velocity at stable conditions over unpromoted and Ru promoted 25%Co/Al_2O_3 catalysts", 250th ACS National Meeting, August 16-20, 2015, Boston, US.

2.3.2.14. Todic B., Nowicki L., Nikacevic N. and Bukur D.B., "Effect of Process Conditions on Fischer-Tropsch Synthesis over an Industrial Iron-based Catalyst", Syngas Convention 2, March 29 – April 1, 2015, Cape Town, South Africa.

2.3.2.15. Todic B., Ma W., Jacobs G., Davis B.H. and Bukur D.B., "Importance of methane formation in determining overall selectivity of Fischer-Tropsch synthesis over cobalt-based catalyst", 249th ACS National Meeting, March 22-26, 2015, Denver, US.

2.3.2.16. Todic B., Olewski T., Nikacevic N., Bukur D.B., "Modeling of Fischer-Tropsch product distribution over Fe-based catalyst", 11th International Conference on Chemical & Process Engineering, June 2-5, 2013, Milan, Italy

2.3.2.17. Ma W., Jacobs G., Todic B., Bukur D.B. and Davis B.H., "Fischer-Tropsch synthesis: Influence of process conditions on deactivation of Ru and Re promoted 25%Co/Al_2O_3 catalysts", 23rd North American Catalysis Society Meeting, June 2-7, 2013, Louisville, US.

2.3.2.18. Todic B., Nikacevic N., Bukur D.B., "Application of detailed kinetics in a fixed bed reactor model for the Fischer-Tropsch synthesis", 9th European Congress of Chemical Engineering, April 21–25, 2013, The Hague, Nederland.

2.3.2.19. Todic B., Ma W., Jacobs G., Davis B.H. and Bukur D.B., "Detailed kinetic model of Fischer-Tropsch synthesis over a cobalt-based catalyst", 9th European Congress of Chemical Engineering, April 21–25, 2013, The Hague, Nederland.

2.3.2.20. Jacobs G., Ma W., Todic B., Bukur D.B. and Davis B.H., "Fischer-Tropsch synthesis: linking cobalt catalyst promoter performance parameters to catalyst structure: an EXAFS investigation", NGCS 10, March 2–7, 2013, Doha, Qatar.

2.3.2.21. Todic B., Ma W., Jacobs G., Davis B.H. and Bukur D.B., "CO-insertion mechanism based comprehensive kinetic model of Fischer-Tropsch Synthesis over Re-promoted Co catalyst", NGCS 10, March 2–7, 2013, Doha, Qatar.

2.3.2.22. Ma W., Jacobs G., Todic B., Bukur D.B. and Davis B.H., "Fischer-Tropsch synthesis: Activity and selectivity of 0.48% Re-25%Co/Al_2O_3 catalyst in a 1L slurry-phase reactor", AIChE Annual Meeting, October 28 – November 2, 2012., Pittsburg, US.

2.3.2.23. Todic B., Bhatelia T., Ma W., Jacobs G., Davis B.H. and Bukur D.B., "Comprehensive kinetic model of Fischer-Tropsch synthesis in a slurry reactor", SynFuel2012 Symposium, June 29-30, 2012, Munich, Germany.

2.3.2.24. Jacobs G., Ma W., Davis B.H., Todic B., Bhatelia T., Bukur D.B., "The application of synchrotron methods in characterizing iron and cobalt Fischer-Tropsch synthesis catalysts," Keynote Lecture, Syngas Convention 2012, April 1-4, 2012, Cape Town, South Africa.

2.3.2.25. Todic B., Bhatelia T., Ma W., Jacobs G., Davis B.H. and Bukur D.B., "Comprehensive kinetic model for Fischer-Tropsch synthesis over a Re promoted Co/Al_2O_3 catalyst", AIChE Spring National Meeting, April 1-5, 2012., Houston, US.

2.3.2.26. Bhatelia T., Todic B., Bukur D.B., Ma W., Davis B.H. and Jacobs G., "Detailed kinetics of the Fischer-Tropsch reaction over a Ru-promoted Co/Al_2O_3 catalyst", Qatar Foundation Annual Research Forum, November 20-22, 2011, Doha, Qatar.

2.4. MAGISTARSKE I DOKTORSKE TEZE – M70

2.4.1. Odbranjena doktorska disertacija - M71:

2.4.1.1. Branislav Todić, "Modelovanje hemijske kinetike i optimizacija reaktora sa pakovanim slojem za Fischer-Tropsch sintezu", Tehnološko-metalurški fakultet, Univerzitet u Beogradu, Beograd, 2015.

2.5. NAUČNA SARADNJA I SARADNJA SA PRIVREDOM

Učešće u međunarodnim naučnim projektima

2.5.1. NPRP 7-559-2-211“Modeling, optimization and dynamic analysis of fixed bed and milli-structured reactors for Fischer-Tropsch synthesis”. Naučno-istraživački projekat Tehnološko-metalurškog fakulteta Univerziteta u Beogradu u saradnji sa Texas A&M Univerzitetom u Kataru, finansiran od strane Katarskog Nacionalnog Istraživačkog Fonda (Qatar National Research Fund) u periodu 2015-2018.

2.5.2. NPRP 08-173-2-050 “ Kinetics of Slurry Phase Fischer-Tropsch Synthesis on a Cobalt Catalyst”. Naučno-istraživački projekat Texas A&M Univerziteta u Kataru, finansiran od strane Katarskog Nacionalnog Istraživačkog Fonda (Qatar National Research Fund) u periodu 2010-2013.

3. ANALIZA PUBLIKOVANIH RADOVA

U okviru svog naučno-istraživačkog rada dr Branislav Todić se bavio ispitivanjem dobijanja sintetičkih tečnih ugljovodoničnih goriva i drugih organskih hemikalija posredstvom Fischer-Tropsch sinteze (FTS).

U okviru izrade svoje doktorske disertacije dr Branislav Todić se bavio ispitivanjem kinetike FTS reakcije, razvojem detaljnih kinetičkih modela za kobaltne FTS katalizatore i primenu tih modela u optimizaciji procesnih uslova u FTS reaktorima sa pakovanim slojem. Rezultati obuhvaćeni ovom disertacijom opisani su u radovima 2.2.1.1., 2.2.1.2., 2.2.1.3., 2.2.1.4., 2.2.2.3. i 2.2.2.6.

U radu 2.2.2.6. predložio je novi detaljni model kinetike primarnih FTS reakcija za 25% Co/0,48% Re/Al_2O_3 katalizator zasnovan na karbidnom mehanizmu i konceptu zavisnosti desorpcije 1-alkena od dužine ugljovodoničnih lanaca. Pokazao je da se uvođenjem ovog koncepta u model FTS kinetike mogu opisati eksperimentalna odstupanja brzina formiranja FTS ugljovodonika različite dužine od konvencionalne Anderson-Schulz-Flory (ASF) raspodele. Predloženi model je dodatno unapređen u radu 2.2.1.4., uvođenjem mehanizma CO-umetanja kao osnovnog mehanizma rasta ugljovodoničnih lanaca u FTS. U ovom radu je pokazano da je većina aktivnih centara na kobaltnom katalizatoru prekrivena sa adsorbovanim molekulima ugljen-monoksida, što se poklapa sa eksperimentalnim merenjima iz literature. Pokazano je da izvedeni model rezultuje u odličnom predskazivanju brzina nestajanja reaktanata (CO i H_2), kao i formiranih $C_1 – C_{15}$ ugljovodoničnih proizvoda.

Analiza selektivnosti dobijanja različitih FTS ugljovodoničnih proizvoda u širokom opsegu procenih uslova (temperature, pritisaka, H_2/CO odnosa i CO konverzija) sa kobaltnim katalizatorom prikazana je u radu 2.2.1.3. Naročito bitan doprinos ovoga rada je isticanje uticaja procesnih uslova na dobijanje metana u FTS. Pokazano je da je velika selektivnost ka metanu u FTS sa kobalnim katalizatorom najverovatnije posledica delovanja dva paralelna mehanizma (primarnog i sekundarnog) u formiranju ovog jedinjenja. Analizom selektivnosti ka 1-alkenima na različitim nivoima konverzije pokazano je da je dominantna sekundarna reakcija ovih jedinjenja hidrogenacija, te da sekundarna readsorpcija sa nastavkom rasta lanca ima zanemarljiv uticaj na FTS selektivnost.

Pregled literature za nove kompaktne i struktuirane milimetarske tipove reaktora, sa posebnim osvrtom na preporuke za unapređenje selektivnosti u takvim sistemima, dat je u radu 2.2.2.3.

U radovima 2.2.1.1. i 2.2.1.2. data je detaljna analiza uticaja procesnih uslova na brzinu i selektivnost FTS reakcije na gvozdenom katalizatoru. U 2.2.1.1. poseban naglasak stavljen je na promene verovatnoće rasta ugljovodoničnih lanaca, kao i odnosa dominantnih proizvoda (n-alkana i 1-alkena), pri različitnim procesnim uslovima. U 2.2.1.2. istaknuta je važnost reakcije vodenog gasa (eng. Water-gas shift) na gvozdenom FTS katalizatoru i njen uticaj kako na brzinu FTS, tako i na selektivnost ka različitim proizvodima.

Radovi kandidata koji nisu bili uključeni u doktorsku disertaciju su 2.2.2.1., 2.2.2.2., 2.2.2.4., 2.2.2.5., 2.2.2.7. i 2.3.1.1. U radu 2.2.2.1. primenjen je model detaljne kinetike u razvoju heterogenog modela FTS konvencionalnih centimetarskih i milimetarskih reaktora sa pakovanim slojevima. U radu 2.2.2.2. predstavljen je model čestice kobaltnog katalizatora i pokazan uticaj otpora prenosa mase unutar katalizatora na efektivnost i selektivnost kobalnog katalizatora. Rad 2.2.2.4. predstavio je empririjski model FTS selektivnosti za gvozdeni katalizator. U radu 2.3.1.1. izveden je detaljni teorijski model kinetike formiranja FTS proizvoda za isti katalizator i upoređen sa eksperimentalnim podacima pri različitim uslovima, kao i rezultatima empirijskih modela selektivnosti. U radu 2.2.2.5. predstavljen je pregled literature o primeni sinhrotronskih metoda u karakterizaciji različitih FTS katalizatora. Rad 2.2.2.7. opisuje eksperimentalne rezultate dobijene sa nizom kobaltnih katalizatora sa različitim promotorima, uključujuci Pd, Pt, Re i Ru. Uticaj promotora na aktivnost i selektivnost FTS je analiziran.

4. CITIRANOST RADOVA

Ukupna citiranost kandidata iznosi 130 bez autocitata (decembar 2017), izvor: Scopus. Prema istoj indeksnoj bazi Hiršov indeks je 8. Citirani su sledeći radovi:

Todic B., Bhatelia T., Froment G.F., Ma W., Jacobs G., Davis B.H., Bukur D.B., "Kinetic Model of Fischer−Tropsch Synthesis in a Slurry Reactor on Co−Re/Al2O3 Catalyst", Industrial and Engineering Chemistry Research, 2013, 52, 669-679. Citiran 34 puta (bez autocitata).

1. Basha OM, Sehabiague L, Abdel-Wahab A, Morsi BI. Fischer-Tropsch Synthesis in Slurry Bubble Column Reactors: Experimental Investigations and Modeling - A Review. International Journal of Chemical Reactor Engineering. 2015;13(3):201-288.
2. Campanario FJ, Gutiérrez Ortiz FJ. Fischer-Tropsch biofuels production from syngas obtained by supercritical water reforming of the bio-oil aqueous phase. Energy Conversion and Management. 2017;150:599-613.
3. Eshraghi A, Mirzaei AA, Atashi H. Kinetics of the Fischer-Tropsch reaction in fixed-bed reactor over a nano-structured Fe-Co-Ce catalyst supported with SiO_2. Journal of Natural Gas Science and Engineering. 2015;26:940-947.
4. Fernandes FAN, Linhares-Junior FE, Cartaxo SJM. Prediction of fischer-tropsch synthesis kinetic parameters using neural networks. Chemical Product and Process Modeling. 2014;9(2):97-103.
5. Förtsch D, Pabst K, Groß-Hardt E. The product distribution in Fischer-Tropsch synthesis: An extension of the ASF model to describe common deviations. Chemical Engineering Science. 2015;138:333-346.
6. Gholami Z, Asmawati Mohd ZabiDi N, Gholami F, Ayodele OB, Vakili M. The influence of catalyst factors for sustainable production of hydrocarbons via Fischer-Tropsch synthesis. Reviews in Chemical Engineering. 2017;33(4):337-358.
7. Golestan S, Mirzaei AA, Atashi H. CO hydrogenation reaction over nano structured Fe–Ni–Mn catalyst: Kinetic and mechanistic studies. Journal of Natural Gas Science and Engineering. 2017;37:280-290.
8. Golestan S, Mirzaei AA, Atashi H. Kinetic and mechanistic studies of Fischer-Tropsch synthesis over the nano-structured iron–cobalt–manganese catalyst prepared by hydrothermal procedure. Fuel. 2017;200:407-418.
9. Hillestad M. Modeling the Fischer-Tropsch Product Distribution and Model Implementation. Chemical Product and Process Modeling. 2015;10(3):147-159.
10. Hussain R, Blank JH, Elbashir NO. Modeling the Fixed-Bed Fischer-Tropsch Reactor in Different Reaction Media. In. Computer Aided Chemical Engineering. Vol 372015:143-148.
11. Jung JS, Hong GH, Park JI, Yang EH, Hodala JL, Moon DJ. Effect of cobalt supported on meso-macro porous hydrotalcite in Fischer-Tropsch synthesis. RSC Advances. 2016;6(106):104280-104293.
12. Khorashadizadeh M, Atashi H, Mirzaei AA. Process conditions effects on Fischer–Tropsch product selectivity: Modeling and optimization through a time and cost-efficient scenario using a limited data size. Journal of the Taiwan Institute of Chemical Engineers. 2017;80:709-719.
13. Ledesma C, Yang J, Blekkan EA, Holmen A, Chen D. Carbon Number Dependence of Reaction Mechanism and Kinetics in CO Hydrogenation on a Co-Based Catalyst. ACS Catalysis. 2016;6(10):6674-6686.
14. Ma T, Imai H, Suehiro Y, et al. Selective synthesis of gasoline from syngas in near-critical phase. Catalysis Today. 2014;228:167-174.
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5. ELEMENTI ZA KVALITATIVNU OCENU NAUČNOG DOPRINOSA KANDIDATA I MINIMALNI KVANTITATIVNI USLOVI ZA IZBOR

5.1. Pokazatelji uspeha u naučnom radu

Pokazatelji uspeha u naučnom radu koji kvalifikuju kandidata dr Branislava Todića za predloženo naučno zvanje su:

- Koautor je 4 naučna rada u izuzetnim međunarodnim časopisima (**M21a**), 7 radova u vrhunskim međunarodnim časopisima (**M21**), jednog poglavlja u monografiji međunarodnog značaja (**M14**), jednog rada saopštenog na skupu međunarodnog značaja štampanog u celini (**M33**) i 26 radova saopštenih na skupovima međunarodnog značaja štampanih u izvodu (**M34**).

- Proveo je više godina na Texas A&M Univerzitetu u Kataru u radu na dva međunarodna naučno-istraživačka projekta, NPRP 7-559-2-211"Modeling, optimization and dynamic analysis of fixed bed and milli-structured reactors for Fischer-Tropsch synthesis" (2015-2018.) i NPRP 08-173-2-050 " Kinetics of Slurry Phase Fischer-Tropsch Synthesis on a Cobalt Catalyst" (2010-2013.).

- Uspešno je odbranio doktorsku disertaciju (**M71**) na Tehnološko-metalurškom fakultetu Univerziteta u Beogradu. U okviru izrade disertacije pokazao je veliku samostalnost u osmišljavanju novih modela i metodologija, analizi rezultata i pisanju naučnih radova.

5.2. Razvoj uslova za naučni rad, obrazovanje i formiranje naučnih kadrova

Učestvovao je u iniciranju i pripremi predloga naučno-istraživačkog međunarodnog projekta NPRP 7-559-2-211 "Modeling, optimization and dynamic analysis of fixed bed and milli-structured reactors for Fischer-Tropsch synthesis" Tehnološko-metalurškog fakulteta Univerziteta u Beogradu u saradnji sa Texas A&M Univerzitetom u Kataru, koji je prihvaćen za finansiranje od strane Katarskog Nacionalnog Istraživačkog Fonda (Qatar National Research Fund) u maju 2014. u visini od približno 900.000 USD. U toku izrade projekta bio je uključen u

rad istraživača Tehnološko-metalurškog fakulteta, kao i rad sa nekoliko studenata u pripremi master radova na Katedri za hemijsko inženjerstvo Tehnološko-metalurškog fakulteta.

5.3. Kvalitet naučnih rezultata

5.3.1. Uticajnost, pozitivna citiranost, ugled i uticajnost publikacija u kojima su kandidatovi radovi objavljeni

U svom dosadašnjem naučno-istraživačkom radu dr Branislav Todić objavio je 4 rada u međunarodnim časopisima izuzetnih vrednosti (4M21a), 7 radova u vrhunskim međunarodnim časopisima (7M21). Ukupna citiranost kandidata iznosi 176, odnosno 130 bez autocitata (decembar 2017., izvor: Scopus). Prema istoj indeksnoj bazi **Hiršov indeks je 8**.

Prema vrednosti impakt faktora časopisa u kojima su publikovani radovi čiji je autor ili koautor dr Branislav Todić, izdvajaju se radovi u časopisima: Journal of Catalysis (IF(2014) = 6.921), Catalysis Science & Technology (IF(2015) = 5.287), Catalysis Today (IF(2016) = 4.636; IF(2014) = 3.893, IF(2013) = 3.309), Industrial & Engineering Chemistry Research (IF(2013) = 2.235), Topics in Catalysis (IF(2012) = 2.608) i Chemical Engineering Research and Design (IF(2015) = 2.525).

Visoka citiranost radova kandidata i impakt faktori časopisa u kojima su objavljeni ukazuje na aktuelnost, uticajnost i ugled objavljenih radova.

5.3.2. Efektivan broj radova i broj radova normiran na osnovu broja koautora, ukupan broj kandidatovih radova, udeo samostalnih i koautorskih radova u njemu, kandidatov doprinos u koautorskim radovima

Dr Branislav Todić je, kao prvi autor, publikovao 3 naučna rada u međunarodnim časopisima izuzethih vrednosti (M21a), 2 rada u vrhunskim međunarodnim časopisima (M21), jedno saopštenje sa međunarodnog skupa štampana u celini (M33) i 13 saopštenja sa međunarodnog skupa štampano u izvodu (M34). Kandidat je takođe koautor određenog broja radova u međunarodnim časopisima (uključujući M21a i M21) i saopštenja na međunarodnim skupovima (M34), u kojima je doprineo u uspostavljanju metodologije, analizi rezultata, kao i pisanju i pripremi rada. Prosečan broj autora po radu za ukupno navedenu bibliografiju iznosi 4,9.

5.3.2. Stepen samostalnosti u naučno-istraživačkom radu i uloga u realizaciji radova u naučnim centrima u zemlji i inostranstvu

Dr Branislav Todić je tokom dosadašnjeg naučno-istraživačkog rada pokazao visok stepen samostalnosti, odgovornosti i inicijative u predlaganju metodologije, uspostavljanju matematičkih modela, obradi rezultata i pisanju naučnih radova. Rezultate svojih istraživanja je sistematski analizirao i publikovao u najuticajnim međunarodnim časopisima posvećenim hemijskom inženjerstvu. U okviru međunarodnih projekata NPRP 7-559-2-211 i NPRP 08-173-2-050, kandidat je proveo ukupno 5 godina na usavršavanju na Texas A&M Univerzitetu u Kataru.

Sumarni prikaz dosadašnje naučno-istraživačke delatnosti			
Kategorija rada	**Koeficijent radova**	**Broj radova u kategoriji**	**Zbir**
Monografska studija/poglavlje u knjizi M12 ili rad u tematskom zborniku međunarodnog značaja (M14)	4	1	4
Naučni rad u izuzetnom međunarodnom časopisu (M21a)	*10*	*4*	*40*
Naučni rad u vrhunskom međunarodnom časopisu (M21)	*5,71-8**	*7*	*49,71*
Saopštenje na skupu međunarodnog značaja štampano u celini (M33)	*1*	*1*	*1*
Saopštenje na skupu međunarodnog značaja štampano u izvodu (M34)	*0,42-0,5**	*26*	*12.50*
Odbranjena doktorska disertacija (M71)	*6*	*1*	*6*
Ukupno			***113,21***

** Usled normiranja naučnih radova po broju koautora po formuli K/(1+0,2(n-3)) za teorijske radove sa više od tri autora, formuli K/(1+0,2(n-5)) za radove o numeričkim simulacijama sa više od 5 autora i formuli K/(1+0,2(n-7)) za eksperimentalne radove sa više od 7 autora. Koeficijenti (K) za radove u kategoriji M21 (koeficijent kategorije je 8) Branislava Todića su redom: 6,67; 8; 5,71; 8; 6,67; 8; 6,67; dajući zbir od 49,71.*
Koeficijenti (K) za radove u kategoriji M34 (koeficijent kategorije je 0,5) Branislava Todića su redom: 0,42; 0,42; 0,5; 0,5; 0,42; 0,5; 0,5; 0,5; 0,5; 0,5; 0,5; 0,5; 0,5; 0,5; 0,5; 0,5; 0,5; 0,5; 0,5; 0,5; 0,42; 0,5; 0,42; 0,42; dajući zbir od 12,50.

Uslov za izbor u zvanje naučni saradnik za tehničko-tehnološke i biotehničke nauke, koje propisuje Pravilnik o postupku i načinu vrednovanja i kvantitativnom iskazivanju naučno-istraživačkih rezultata istraživača je da kandidat ima najmanje 16 poena koji treba da pripadaju sledećim kategorijama:

Minimalni kvantitativni zahtevi za sticanje zvanja naučni saradnik	**Minimalno potrebno**	**Ostvareno**
Ukupno	16	**113,21**
M10+M20+M31+M32+M33+M41+M42+M51 +M80+M90+M100	9	**113,21**
M21+M22+M23	5	**89,71**

ZAKLJUČAK

Na osnovu detaljne analize dosadašnjeg naučno-istraživačkog rada i ostvarenih rezultata dr Branislava Todića, Komisija smatra da kandidat ispunjava sve uslove neophodne za sticanje zvanja NAUČNI SARADNIK i predlaže Nastavno-naučnom veću Tehnološko-metalurškog fakulteta Univerziteta u Beogradu da ovaj izveštaj prihvati i prosledi odgovarajućoj Komisiji Ministarstva prosvete, nauke i tehnološkog razvoja Republike Srbije na konačno usvajanje.

U Beogradu, 21.12.2017. godine

ČLANOVI KOMISIJE:

_____

Dr Nikola Nikačević, vanredni profesor
Tehnološko-metalurški fakultet, Univerzitet u Beogradu

_____

Dr Aleksandar Orlović, redovni professor
Tehnološko-metalurški fakultet, Univerzitet u Beogradu

_____

Dr Aleksandar Jovović, redovni profesor
Mašinski fakultet, Univerzitet u Beogradu