Bibliometric Analysis "Materials Chain"

UA Ruhr | 15.11.2016 | Dr. Dirk Tunger, Andreas Meier, Philipp Zeitler

Introduction to the bibliometric study

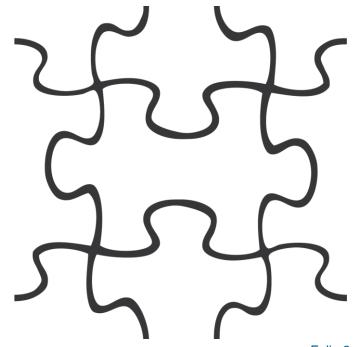
Time period of observation: 2011 – 2015

Databases used: Web of Science and Scopus

Aim: Creation of a modular bibliometric study focusing on the publication behavior of "Materials Chain" at UA Ruhr

Module 1 und 2 are reflecting the **classic bibliometric** indicators

Module 3 und 4 are based on **social network analysis** and focusing on the structures.



Databasis

Based on a list of MC-members search queries which were defined for the scientific databases "Web of Science" and "Scopus". Every name is connected to the institution he or she is affiliated to.

Data status: 1st July 2016

Nachname	Vorname	Einrichtung	
Albers	Bettina	University of Duisburg-Essen	Albers, B
Anders	Frithjof B.	TU Dortmund University	Anders, F
Appel	Tamara	Dortmund University of Applied Sciences and Arts	Appel, T
Atakan	Burak	University of Duisburg-Essen	Atakan, B
Awakowicz	Peter	Ruhr-Universität Bochum	Awakowicz, P
Bacher	Gerd	University of Duisburg-Essen	Bacher, G
Barcikowski	Stephan	University of Duisburg-Essen	Barcikowski, S
Bartel	Thorsten	TU Dortmund University	Bartel, T
Barthold	Franz-Joseph	TU Dortmund University	Barthold, F
Bartsch	Marion	Ruhr-Universität Bochum/German Aerospace Center	Bartsch, M
Bathen	Dieter	University of Duisburg-Essen	Bathen, D
Behrens	Malte	University of Duisburg-Essen	Behrens, M
Ben Khalifa	Nooman	TU Dortmund University	Ben Khalifa, N
Benson	Niels Jon	University of Duisburg-Essen	Benson, N
Betz	Markus	TU Dortmund University	Betz, M
Bickendorf	Jobst	TU Dortmund University	Bickendorf, J
Biermann	Dirk	TU Dortmund University	Biermann, D
Birk	Carolin	University of Duisburg-Essen	Birk, C
Bluhm	Joachim Willi Otto	University of Duisburg-Essen	Bluhm, J
Bobisch	Christian Alexander	University of Duisburg-Essen	Bobisch, C
Bock	Claudia	Ruhr-Universität Bochum	Bock, C
Bongert	Markus	Dortmund University of Applied Sciences and Arts	Bongert, M



WEB OF SCIENCE™

1 1,573 Au=(Awakowicz, P or Bartsch, M or Bock, C or Chakraborty, S or Dette, H or Devi, A or Drautz, R or Eggeler, G or Eremin, I or Fischer, Roland or Fischer, RA or Frenzel, J or Fries, S or George, E or Gies, H or Gurevich, E or Hackl, K or Hammerschmidt, T or Hartmaier, A or Hägele, D or Hofmann, Martin or Hofmann, MR or Janisch, R or Junker, P or Köhler, Ulrich or Köller, M or Kruggel-Emden, H or Kruggel, H or Kunze, U or Ludwig, Alfred or Madsen, G or Meschke, G or Muhler, M or Nestorovic, T or Ostendorf, A or Pfetzing-Micklich, J or Pfetzing, J or Rogal, J or Roldan Cuenya, B or Schreuer, J or Schuhmann, W or Somsen, C or Stöllner, T or Steinbach, I or Theisen, W or Tschulik, K or Varnik, F or von Keudell, A or Westerholt, K or Wieck, A or Xia, W or Awakowicz, P or Bartsch, M or Bock, C or Chakraborty, S or Dette, H or Devi, A or Drautz, R or Eggeler, G or Eremin, I or Fischer, Roland or Fischer, RA or Frenzel, J or Fries, S or George, E or Gies, H or Gurevich, E or Hackl, K or Hammerschmidt, T or Hartmaier, A or Haegele, D or Hofmann, Martin or Hofmann, MR or Janisch, R or Junker, P or Koheler, Ulrich or Koeller, M or Kruggel-Emden, H or Kruggel-Emden, H or Kruggel, H or Kunze, U or Ludwig, Alfred or Madsen, G or Meschke, G or Muhler, M or Nestorovic, T or Ostendorf, A or Pfetzing-Jone, K or Yangel-Emden, H or Kruggel, J or Rogal, J or Roldan Cuenya, B or Schreuer, J or Fries, S or George, E or Gies, H or Gurevich, E or Hackl, K or Hammerschmidt, T or Hartmaier, A or Haegele, D or Hofmann, MR or Janisch, R or Junker, P or Koehler, Ulrich or Koeller, M or Kruggel-Emden, H or Kruggel, J or Rogal, J or Roldan Cuenya, B or Schreuer, J or Schuhmann, W or Somsen, C or Stoellner, T or Steinbach, I or Theisen, W or Tschulik, K or Varnik, F or von Keudell, A or Westerholt, K or Wieck, A or Xia, W) and (ad=((ruhr uni*) same (bochum)) or og=Ruhr University Bochum) and py=2011-2015

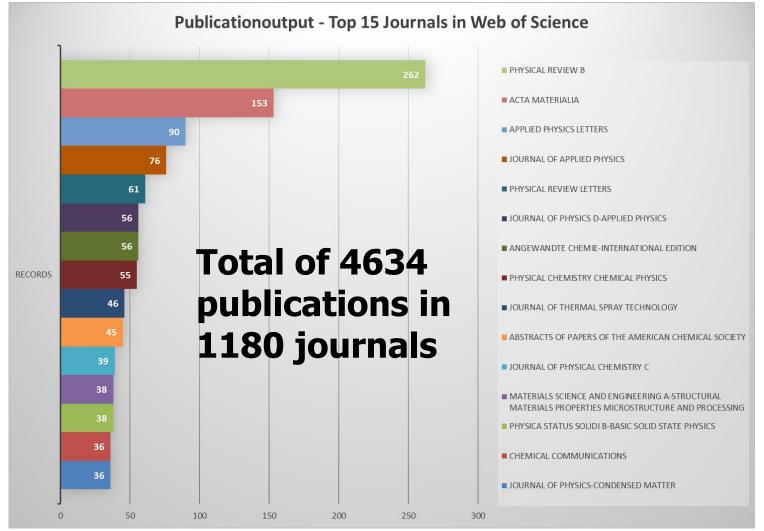
👁 Aim

Overview of the publication behavior

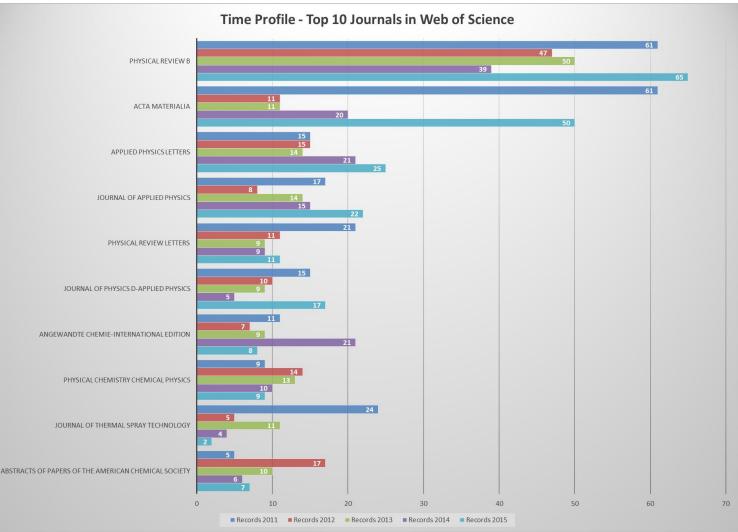


Central questions

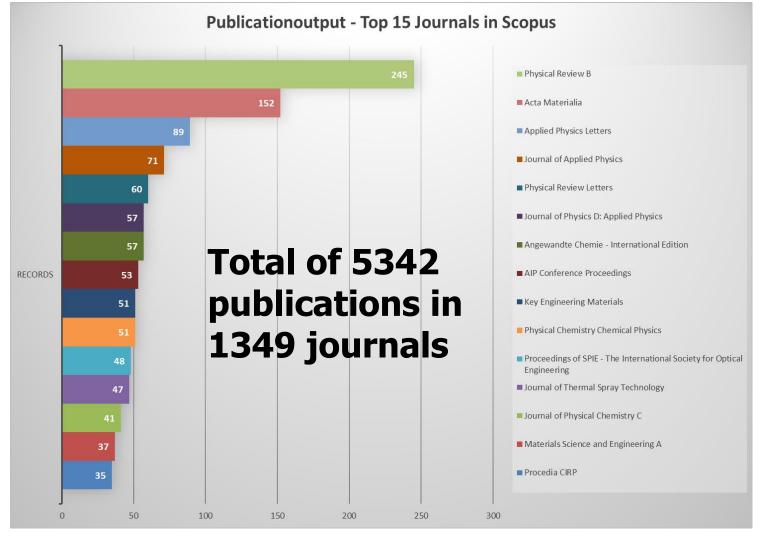
- Were the best sources (Journals) used?
- Are these the journals, MC expects to have the best audience?
- Are important sources missing?



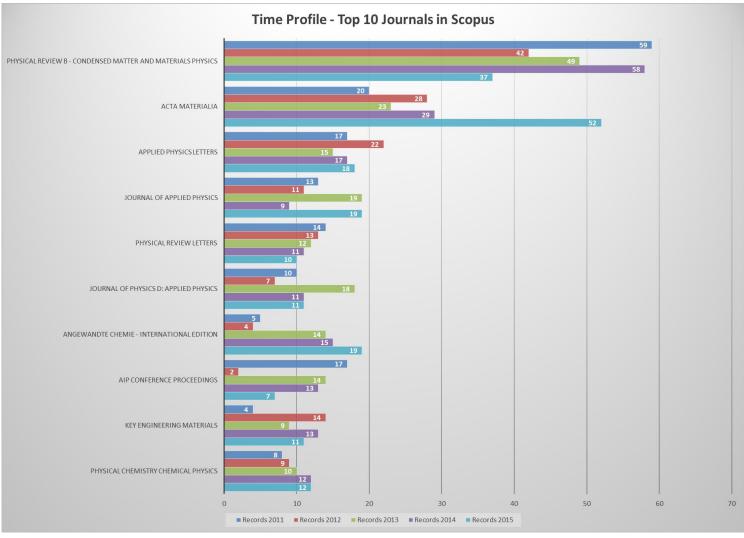
Please note the skewed distribution of publications over sources: 1 % of the journals is listed in the diagram, representing 23 % of the publications



Publications in journals are not constant over a period of time. Are there publications regularly in the journals, that are important from a scientific or thematic point of view?



The results of "Web of Science" and "Scopus" are very similar; the number of publications as well as the number of sources is 15 % higher in Scopus in comparison with "Web of Science"





👁 Aim

Overview of the citation impact





Central questions

• What are the High-Impact Journals that were used for publication and which are not used?

Top 10 Journals by Journal Impact Factor (WoS)

Journal	Number of Publications	Number of Citations Top Paper	Citations per Paper (CPP)	Journal Impact Factor 2015
NATURE MATERIALS	3	88	40,0	38,9
NATURE	3	90	38,7	38,1
CHEMICAL REVIEWS	4	344	105,8	37,4
NATURE NANOTECHNOLOGY	3	35	17,7	35,3
SCIENCE	4	34	21,0	34,7
CHEMICAL SOCIETY REVIEWS	6	409	134,0	34,1
REVIEWS OF MODERN PHYSICS	1	174	174,0	33,2
NATURE GENETICS	1	296	296,0	31,6
NATURE PHOTONICS	1	1	1,0	31,2
CELL	1	6	6,0	28,7

These are the TOP Journals based on Impact Factor that were used for publication by the members of MC.

Definition of J-Factor

The J-Factor is a variable that can be used for discipline-independent comparisons based on the relative visibility of publications. It is the only variable that can be directly used to compare different entities across disciplines. The J-Factor describes the relative visibility J of an entity in comparison with individual scientific communities. The factor is calculated by summation of the ratio of the citation rates of the publications of the entity being investigated and the citation rates of all publications in each of the journals, weighted in each case with the proportion of these publications in the selected journal in relation to all of the entity's publications.

J-Factor results (WoS)

Institute	J-Factor all document types	Publications total	J-Factor A&R	Publications A&R total
Materials Chain total	108,1%	4627	107,9%	4005
Uni Bochum	97,7%	1561	97,7%	1407
TU Dortmund	107,4%	882	99,1%	697
Uni Duisburg-Essen	105,9%	1681	109,3%	1436

Institute	J-Factor Journals A&R with min. 5 Publications	Publications total
Materials Chain total	104,2%	3430

Institute	J-Factor A&R 2013	Publications A&R 2013	
Materials Chain total	108,8%	765	
Uni Bochum	92,9%	291	
TU Dortmund	109,0%	132	
Uni Duisburg-Essen	117,5%	270	
Institute Comparison			
RWTH Aachen	118,3%	2836	
MIT	129,6%	6339	

The J-factor is approximately 8 % higher than expected. The same result is achieved, if you restrict on document types or on Journals with a minimum of 5 publications.

J-Factors of RWTH Aachen and MIT from the year 2013 were used for comparison.

Network analysis



Overview of the structure of the cooperation between the members of MC





Central Question

• Who is cooperating with whom?

Web of Science Hesterberg,S Dreier,T Somoitz,H Schlücker,S Otto,B Posch,P 2011-2015 Mauk,P Gutmann, J Schmuck, C Perau.E Awakowicz,P Appel,T Kowalczyk,W Wlokas, Textor,T Schulz,Costendorf,A Mertin,W Kempf,A Geller, M Gurevich, E Anders, F Uhrig.G Brillert,D Barthold, F Wittmar,A Kuhlbusch,T Wiggers,H Ulbricht,M Tegude,F Kümmell,T Geller,M Prost,W Schultze.T Kasper,T Bacher, G König, J Greilich,A Erni,D Schmechel,R Schleberger,M Meyer,C Hägele,D Lorke,A Kierfeld,J Henke,M Niemeyer, Benson,N Hartmann,N Betz,M Nienhaus,H Schneider,C Bathen,D Röger, M Wolf.D Bayer, M Epple,M ^{Orlowsky,J} Atakan,B_{lansen},G Wieck,A Rauh,D Rehage, H Dette,H Müller,C Sokolowski-Tinten, K Römer, F Hofmann,M Schüth,F Rademacher,A Kast.S Bobisch,C Mayer,C Kunze,U Felderhoff,M Khan,S Grabmaier,A Wende,H Bock,C Paulus, M Kuhnt, S Gröschel, A Köller,M Shvartsman,V Weidenthaler,C Wöhrl,N Schulz,S Meyer zu Heringdorf,F Ludwig, Ar Kirchartz,T Rösch,A Wagner,T Schmidt,W Ligges,M Weihs,C Tolan,M Farle,M Tüysüz,H Gebauer.l Lupascu.D Horn von Hoegen,M Universität Tekkaya,A Barcikowski,S Devi.A Westerholt,K Gruner,M Duisburg-Essen Vogt,H Ludwig, Al Baumann,I Sternemann,C Ben Khalifa,N Wiedwald,U Vadalà, M Grünebohm, A Ruhr-Universität Pentcheva,R Fischer, RA Biermann, D Walther, F Künne, B Fischer,A Bovensiepen,U Bochum Schnellenbach-Held,M Köhler,U Gökce,B Tillmann,W Zielke,R Kratzer, P Eremin, Forschungszentrum Wojarski, L Müller,E Schuhmann,W Zabel,A Jülich Kersting,P Brands,D Frenzel,J Raabe,D Gies,H Kai**s**er,T ^{Deike,R} Bartsch,M Tiller,J Eggeler,G Pfetzing-Micklich,J Menzel,A Katzenberg,F MPI Eisenforschung Schröder,JHickel,T Selvadurai,U Wortberg,J Klawonn,A Strangböner,N Neugebauer,J Xia,W Muhler,M Theisen,W Thommes,M Ostwald,R Sadowski,G FH Bochum Neff,P Behrens,M Hammerschmidt,T Somsen,C Weberskirch,R Witt,G Bartel, T_{Kiefe}r, B Bluhm, Strunk,J Starke,G **TU Dortmund** Varnik, F Fries, S Brümmer.A Schwarz,A / Kokozinski,R Chakraborty,S Schützhold,R Bickendorf.I Ricken,T Steinbach, IGeorge, E Kruggel-Emden,H FH Dortmund Stöllner.T Rogal,J Drautz.R Morik,K Mosler, Kays,R Hartmaier,A Giese,M Roldán Guenva,B Stöhr,A Hülsbusch,D Willms,U Madsen,GJunker,P Vaßen.R Universität zu Köln el Moctar, B Tschulik.K Woerner. Hackl,K Nestorovic,T Schweizer,B Wiederkehr.T Birk,C MPI von Keudell,A Bongert,M Roidl.M Janisch,R Klinge,S Hasselbrink,E Kohlenforschung Mauer.G Albers,B Stommel.M Kruis,E Meschke,G Spohr,E Clason,C Hutzen**t**haler,M Weis,T MPI CEC

Network analysis

The network shows the single members of MC and the connections to the other members he or she co-published with. A thicker line indicates a stronger co-publication activity. The network does not change over time. That means that there is a high level of continuity in the cooperation behavior.

Content analysis

🖙 Aim

Overview on topics and keywords



Central Question



• What are the topics or buzzwords the publications are about?

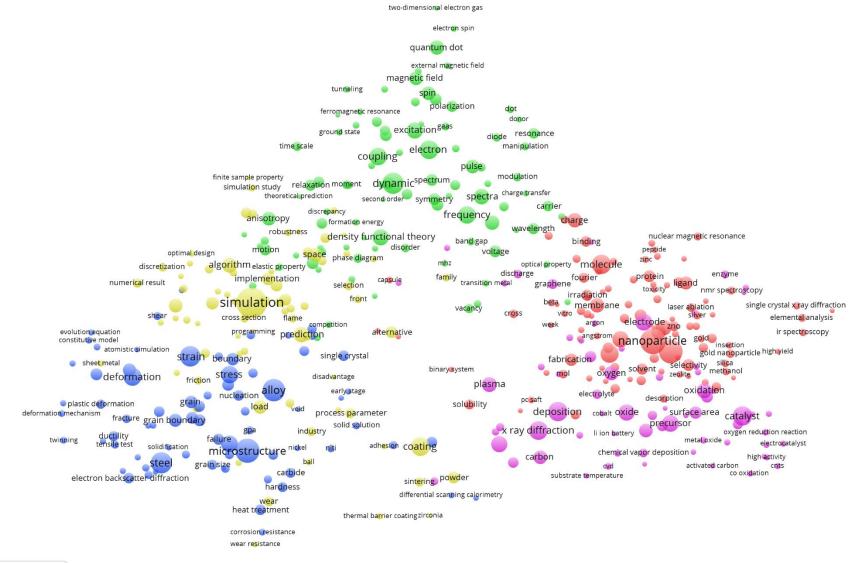
Content analysis explanations

The more central a term for the examined documents, the more central is the position of this term in the network. Centrality arises from the fact that a concept with a large number of the other terms occurs together in the same documents. On the other hand, frequently occurring terms which are only mentioned together with a small number of other terms are further outwards in the representation. In addition, the terms which are most common together, are clustered together. Clusters are characterized by the same color of the circles and form thematic sub-areas of the analysis. The size of the circles is proportional to the occurrence of a single concept. A thesaurus does exclude non-meaningful terms and synonyms.

The diagram does not have any axes.

The bubble charts are showing the main buzzwords, concepts and topics, the scientific papers of MC are about.

Web of Science 2011-2015 Minimum occurence of a term: 15



Conclusion

- The results on the publication behavior and high-impact journals make it possible to develop a publication strategy.
- The J-Factor represents the citation impact and shows that the publications of MC are cited as often as expected.
- The network analysis showed the single members of MC and their copublication behavior. The network does not change over time. That means that there is a high level of continuity in the cooperation behavior.
- The bubble charts are showing the main buzzwords, concepts and topics, the scientific papers of MC are about.



Thank you!

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