

A Cross-Linguistic Comparative Study of Meronymy in Electric Power Network Field

Sojida Mustafaeva

Termez State University of Engineering and Agrotechnologies, Termez, Uzbekistan

a) Corresponding author: sojidamustafayeva557@gmail.com

Abstract: This research work analyzed the meronymic words based on the electricity supply system in two languages - English and Uzbek – based on the principle of comparability. More than ten meronymic lexemes, which are divided into partial forms of household appliances, and equipment-based techniques necessary for daily lives, and which define the functional networks of electricity transmission, heating, cooling, and lighting, were analyzed on a systematic basis. During the analysis, it became clear that meronymic words have a unique semantic potential in both languages: a lexical base and cultural deference. The study did not ignore the typological and semantic structures of the English and Uzbek languages, and undoubtedly, the naming formulas and levels of semantic intensity of terms in both languages were studied together. When comparing the words related to electrical terms in English with their Uzbek lexemes, the initial difference for both languages was that they had their own universality and differences in terms of naming features – terminological strictness, semantic range, part-whole hierarchy level, and pragmatic dependence on the function of the category. Analysis of meronymic terms shows that they are closely linked to other lexical relations, such as polysemy, synonymy, and functional connections. Such features are a complex process in determining the level of accuracy in both languages, and solution was explained with examples based on the criteria of word frequency, contextual level, and semantic layer in English and Uzbek. As a result, language learners, experts in the field will have the opportunity to apply, use, and interpret meronymic (partial) words in theoretical and practical contexts, without losing the value of their interest and knowledge of concepts.

INTRODUCTION

In the modern linguistic world, meronymic relations are crucial in studying the semantic relationship between an object and its components. Meronyms are relationships that form an object hierarchy from whole to parts. As a practical expression of the meronymic system, expressions related to household appliances, that are based on electric items which are often used in everyday life, are an important stage.

Meronyms related to household appliances are defined as a system of words that occupy a central place in the vocabulary of each language, especially when such words are studied in more than one language such as in English and Uzbek languages as a comparative manner, for example, comparing the lexical composition, methods of reflection, and semantic properties of meronymic units expressing their functional performs in Uzbek and English, creating a unique stage of improvement for the current modern lexicographic system, in particular in the field of linguistic corpus which works as vocabulary corpus model. To express the the parts of whole – “holonym” in English, for example, “junction box” includes these meronyms such as “cable clamp”, “clamp nut”, “wire nut” the creation of a model in the form of a single-system corpus of terms for common household electric items, special terms, the names of their components and constructions is currently a major topic in the field of linguistics. The purpose of the article is to show the logical connections and cultural oppositions of meronyms, as well as to show the similarities and differences between them in the English and Uzbek lexical systems.

Electric words which are identified as meronyms (parts) are represented as their full lexical components in all modern vocabularies: Webster’s Third New international Dictionary of the English Language (1961), New Oxford Dictionary of English (1998), Longman Language Activator (1993), Cambridge International dictionary of English (1995), Longman Lexicon of Contemporary English (1981), WordNet, Princeton, Lexical Definition & Meaning [21-32], and Explanatory Dictionary of the Uzbek language [1-20], Uzbek lexical corpus system, Imlo.uz, Synonym.uz etc.

EXPERIMENTAL RESEARCH

The use of meronyms as language elements in linguistics, especially in our daily life part and to study them analytically as a separate topic has been highlighted by English researchers in their scientific works in the form of practical examples. In world linguistics, the scientist M.V. Nikitin (1988) who covered the concepts of meronym in a broader sense, introduced the study of the whole and its partial elements as semantic-structural meaning individuality into the science. In Uzbek linguistics, such as B.Kilichev, A.Sobirov, were the first to speak about the concepts of meronyms (part-whole) relations, and H.Ne'matov, R.Rasulov, B.Kilichev, and H.Jamalkhonov provided information in their research works about "partonyms" expanding the vocabulary. D.A.Kolodka, N.Kuzmenka, V.Zakharov and E.O.Materinski are also known as researchers who have widely promoted the scope of research on both linguistic and cognitive principles of the meronymic concept. As lexicographers H.Jackson (2003), Robert Ilson (1985), James Murray, Noah Webster, V.G.Gak (1990), A.Madvaliev (2021), A.Hojiev (2002), Sh.Rahmatullaev (2003; 2009) and others contributed to create dictionary and its explanation concepts, manual books in lexicographic world. And from these dictionaries we can find terms based on household electric items. Today many Uzbek scientists, researchers and learners are conducting extensive research on meronymic words. In this regard, B.Kilichev "Whole-part relationships between words in lexicon" [3: 2019], A.Eshmuminov "Formation of a linguistic base of taxonomic and meronymic related lexemes for Uzbek language corpora" who contributed to the research on meronymy and its various aspects as for its classification, lexical representation, and cross linguistics features in English and Uzbek, particularly, their works have laid a foundation for understanding how part-whole relationships are encoded in different languages and how these relationships can be systematically described in lexicographic and corpus-based studies [1: 2023]. S.U.Mustafaeva has explained: "Meronyms have clear explanations in each contexts which functions individual meanings" which these are based on the use of meronymic words in the two languages such English and Uzbek in her article "Uzbek and English dialects are used as examples to illustrate the problems with vocabulary creation in meronymy" [6: 2025]. In presenting this work on the basis of theoretical ideas and in examples of their practical analysis. The theoretical analyses in our study are underpinned by the following key methodologies.

a) *Descriptive method* – this method allows for the analysis of meronymic units in both Uzbek and English, determining their role in the lexicographic process. For example, this method was used to study the types of meronymy used in Uzbek and English as well how these units are included in dictionaries;

b) *Comparative method* – this technique allows us to compare the representation of meronymic units in Uzbek and English dictionaries. It examines how meronymic meanings are classified in English dictionaries and how such units are explained in Uzbek dictionaries. Furthermore, the similarities and differences in the use of meronymy between the two languages were analyzed using this approach;

c) *Structural-semantic method* – focuses on the study of the structure of word meanings in dictionaries. It is especially useful in analyzing how meronymic changes occur. Questions like "How are the primary and meronymic meanings of a word interconnected?" and "Which meanings are designated as primary in the dictionary, and which are secondary?" can be answered through this method;

d) *Componential analysis* – meronymy is separated into components which it is divided into several componential parts, so it forms hierarchical structure. Therefore, this method is the primary approach for revealing the impact of meronymy on the worldview of speakers, as well as for exploring the lexical-semantic theory of meronymic units in both Uzbek and English languages;

e) *Lexicographic analysis* – is essential in the theory of dictionary-making. It allows for an investigation into how meronymic units are incorporated and explained in various dictionaries, thus defining the scope of their expression. The differences in the stylistic approaches to presenting meronymic meanings in Uzbek and English dictionaries were also explored through this methodology. Through lexicographic analysis, we observed the dialectal variations in the usage and expression of meronymic words in the two languages;

f) *Corpus analysis* – is to study how and how frequently specific words or linguistic units appear in a sizable corpus of real-world texts such as newspapers, novels, conversations, online posts, etc. – is known as corpus analysis. This approach aids in the analysis of language units' contextual meanings, stylistic elements, and everyday usage.

RESEARCH RESULTS

In this analysis, we first consider meronyms in the context of the Princeton WordNet (PWN), a lexical database widely used in the world of English lexicography, which is a key resource for understanding English lexicon when it comes to meronymy. It organizes words into set of synonyms (synsets) and includes detailed semantic relationships

like meronymy. To determine the part-whole words in English, we can address to the English dictionaries and Lexical words: definitions & Meanings. From these dictionaries we can various of lexical sets, for example, household appliances related to electric items: “rocket”, “cable”, “lamp”, “bulb”, “air conditioner”, “cooker”, “washing machine”, “plug”, “microwave”, “shield” etc. The interpretation of meronymic words in Uzbek dictionaries is not specific, but they are defined as part of a certain object or phenomenon from a given context, we analyzed them by selecting words related to meronymic relations from the ‘Explanatory Dictionary of the Uzbek Language’. S.U.Mustafaeva addressed in her article “Uzbek and English dialects are given as examples to illustrate the problems associated with creating a dictionary in meronymy. The idea how meronymic relations that is , part-whole connections, are expressed and sheds light on the phenomenon of how “part”/ “share”/ “piece” are expressed in the compared languages. All are gathered in one hierarchical set creating particular word meaning in dictionary”. By comparing the above-mentioned sources, it is possible to observe how linguistic, cognitive and lexicographic factors affect the expression of meronymy. In this, the analysis reveals similarities and differences in the processing of parts and wholes in the two languages, enriching our understanding of their lexical systems and cognitive structures of part-whole connections of words in contexts. When comparing words in each field between languages, the typological characteristics of the languages are directly determined as a point of analysis. This diagram follows as the process of comparative typology of languages.

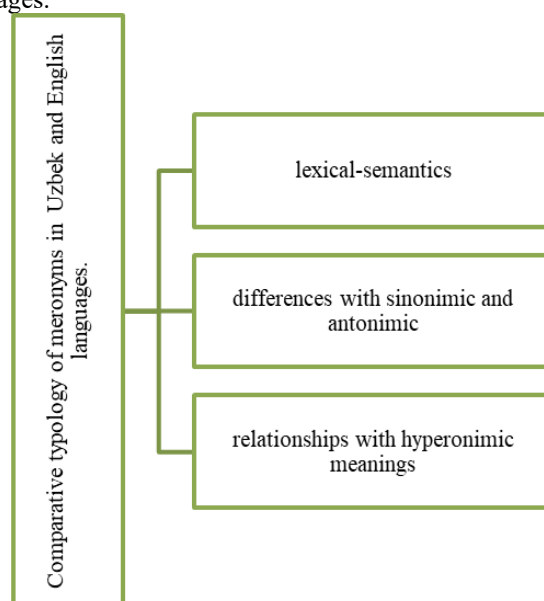


FIGURE 1. The process of comparative typology of languages.

Today there are more modern online dictionaries which can help to determine every word of formations and its typological resources. For example, when searching the meronymy from the WordNet-Online (Free dictionary and thesaurus of English Definitions: synonyms, antonyms, and polysems etc.) it shows like that:

Definitions from WordNet

Noun meronym has¹ sense

meronym *part name* – a word that names a part of a large whole; “brain” and “crown” are meronyms of “hat” -1 is a kind of word

Definition from the web

Term meronym

Definition:

A meronym is a term used in linguistics and semantic theory to describe a part or member of something larger. In this context, it refers to words that represent components, elements, or parts of a whole.

From the “Cambridge English Dictionary” meronym is determined as a component of something, such as “bud” has got 172 meaning as part of something, it is following that:

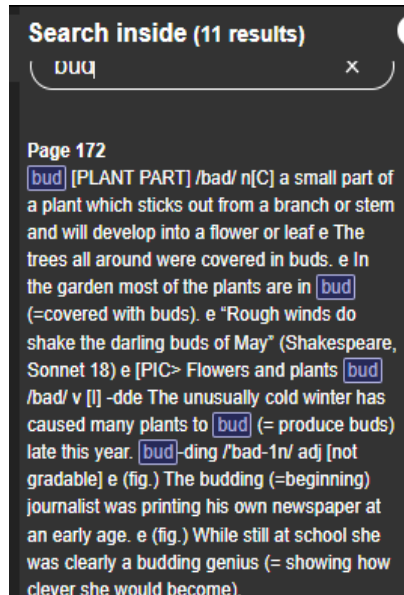


FIGURE 2. Different meanings of the word

Electric words that are combined the whole – holonymic relations and which organizes its elements are meronymic relations, such as:

TABLE 1. Table of comparison of holonym and meronym

Item	Holonym	Part (meronym in En)	Part (meronym in Uz)
home appliance	Kitchen	socket, plug, cable, switch, bulb	rozetka, vilka, kable, tugma (bosgich), chiroq
home appliance	microwave oven	control panel, power, waveguide, magnetron	boshqaruv paneli, quvvat tok o'tgazgich, to'lqin o'tgazgich, magnetron
home appliance	washing - machine	shaft, switch, engine, rotator, alarm, filter, cover, camera, motor, control panel, water pump, outer housing	dvigatel, tashqi korpus, rotator, signalizatsiya, suzgich, qopqoq, kamera, motor(dvigatel), boshqaruv paneli, suv nasos, fiktr, tashqi korpus

When comparing Uzbek meronymic words with English variants, they have certainly differences with their translation equivalents in both languages, for example, in English more words have modern terms which they are particularly not equality in Uzbek words. In such cases, they are undoubtedly given in their own name in another language, as above, or their descriptive style is used which refer its full semantic meaning in context. For instance, “plug” is expressed as “there are three meanings based on electric power:



- a) a small plastic or rubber object with two or three metal pins, attached to the end of a wire on a piece of electric equipment and pushed into a special opening in a wall to connect the equipment to a supply of electricity;



- b) an electric socket

c) a metal pin at the end of a long wire joined to a piece of electrical equipment and used to connect it to another piece of electrical equipment - in open online free Cambridge University Press & Assessment (2025). If we compare this meronymic part word in Uzbek equality is “vilka” but it has another meanings and how to identify its origin meaning that we applied to find concrete meaning from “Explanatory dictionary of the Uzbek language” which there are three meanings: a) *vilka – sanchqi*: Ovqatni sanchib oladigan dastali asbob (in En: fork – a tool with a handle for pricking food); b) *tex. Ayri uchli har xil detallarning nomi, shtepsel vilkasi* (in En: tech. the name of various etails with separate ends, a plug); c) *shaxm. Asp (ot) yoki piyodaning ayrisimon, bir yo’la ikki sipohga xujum qilish holati* (in En: chess. The position of a knight (horse) or a footman attacking two soldiers at once, in a split position); S.U.Mustafaeva emphasized; “Meronymic relations of meaning serve the progressive growth of the vocabulary in dictionaries in language as well as it the main step of lexicographic progress in Uzbek and English in particularly dialect speech” [8: 2025]. Comparing words related to the field in part-whole form relationships and matching its translation equalities in languages are the best linguistic corpus model to expand the vocabulary system in language.

An analysis of meronymic units related to household appliances in English and Uzbek dictionaries reveals patterns that are both universal and specific to each language in the representation of parts and wholes. Lexicographic resources are divided into following parts like:

- Princeton WordNet
- Cambridge Advanced Learner’s Dictionary
- Longman Dictionary of Contemporary English
- Oxford Dictionary

providing systematic identification of meronyms often contextualized within synsets that clarify semantic relationships. For example:

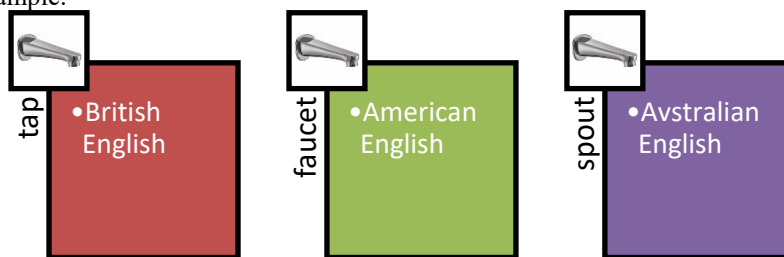


FIGURE 4. Meronymic differences in three languages

Different lexical units to denote part-whole relationships, reflecting regional differences while retaining basic semantic links. In contrast, Uzbek dictionaries, especially, the “Explanatory Dictionary of the Uzbek Language” offers less formal representations of the relationships between words, and often rely on contextual interpretation. Our study shows that regional dialects of Uzbek, particularly those of Tashkent, Fergana, Samarkhand introduce unique terms such as “chovgun” which refers to a multifunctional household container, thus highlighting the interaction between cultural practices and lexical choice [32-55]. These dialects variations correspond to the regional differences observed in English, supporting the idea that meronymy is not only a linguistic but also a sociocultural phenomenon. Grouping household appliances meronyms into semantic groups (kitchen utensils; furniture items; clothes and tools) facilitates systematic interlinguistic comparison. The distinction highlights the impact of linguistic classification on the expression of meronymy and underlines the need to take into account morphological and syntactic characteristics in lexical modeling. Moreover, contrastive analysis highlights the importance of corpus-based approaches for identifying real-world usage patterns.

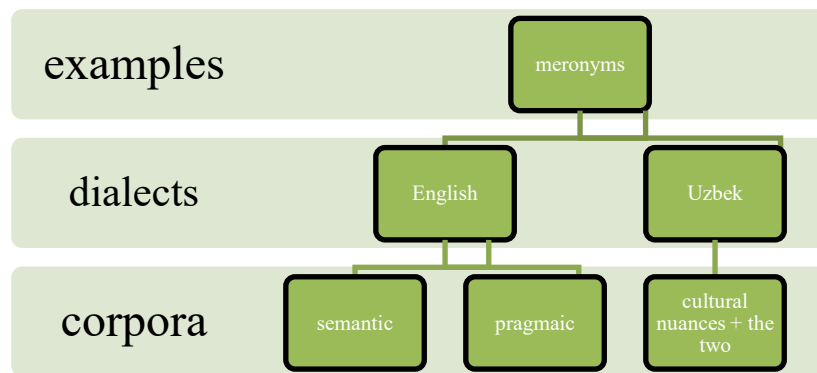


FIGURE 5. Analysis of meronymic relationships in Uzbek and English languages

“Refrigerator” in English is an equivalent in Uzbek is “sovutgich” which is given as an equal meaning. By equaling each word with its suitable variations are related to not only semantic, pragmatic, lexical, functional performs but also its cultural nuances related to local usage. Summarizing the discussion, it can be said that meronymy in English and Uzbek demonstrates both interlingual similarities and divergences, which are influenced by dialectal, cognitive and cultural factors. A corpus-based lexicographical model incorporating this information enables the creation of more accurate, consistent, and culturally sensitive dictionary entries, providing a practical basis for bilingual lexicography, translation, and applied linguistic research.

CONCLUSIONS

This study examined the electric lexical representativeness and semantic ramification of device-related meronyms in Uzbek and English. By analyzing how device parts are named and categorized in both languages, we identified significant linguistic and cultural patterns. First, the study shows that English exhibits a higher degree of lexical specialization in the names of household appliance parts, often reflecting a more technical or industrial approach. Contrastingly, in Uzbek there is a prevailing tendency to use more general or multifunctional terms, sometimes based on cultural context or preactical usage rather than technical precision. Secondly, the semantic branching of meronyms reveals how different languages conceptualize objects in terms of their parts. English often exhibits a deeper hierarchical structure of meronyms, while Uzbek prefers more linear or function-oriented semantic groupings. Given as examples, in English, “a washing machine” may have clearly labeled components such as an “agitator”; “drum”; “lint filter” whereas in Uzbek, broader terms such as “drum” or “filter” may cover multiple functions or parts.

We can highlight as their differences:

- a) *The influence of cultural;*
- b) *Technological;*
- c) *Linguistic factors on vocabulary formation.*

In addition, the analysis contributes to a broader understanding of lexical systems in typologically diverse languages and can help in such fields as translation studies, language teaching, and computational linguistics. In summary, the comparative study of meronymic words consisting of electrical household items shows its structure system which enriches our understanding of how languages represent part-whole relationships and highlights the importance of culture-oriented semantic analysis when working with technical and electrical terms.

REFERENCES

1. A. Eshmuminov, *Formation of a Linguistic Database of Lexemes with Taxonomic and Meronymic Relations for Uzbek Language Corpora* (Monograph, Termiz, 2023), 93 p. (in Uzbek).
2. A. Sh. Sobirov, *Problems of Linguistic and Literary Theory* (unpublished academic work).
3. B. Qilichev, *Whole–Part Relations Between Words in Lexicon* (Monograph, Tashkent, 2019), pp. 4–5 (in Uzbek).
4. H. Jamolxonov, *Modern Uzbek Literary Language* (Talqin, Tashkent, 2005) (in Uzbek).
5. H. Jackson, *Lexicography: An Introduction* (Taylor & Francis e-Library, London, 2003), pp. 5–6.

6. S. U. Mustafaeva, "Lexicographic interpretation of meronyms in Uzbek and English languages," in *The Role of Women in the Development of Science and the Spiritual and Educational Sphere: Problems and Solutions*, International Scientific and Practical Conference (2025), Article No. 15.
7. O. Toshbekov, M. Urazov, S. Yermatov, and M. Khamraeva, "Efficient and economical energy use technology in the processing of domestic coarse wool fiber," *E3S Web of Conferences* **461**, 01068 (2023). <https://doi.org/10.1051/e3sconf/202346101068>
8. K. Jumaniyozov, M. Urozov, O. Toshbekov, M. Salimova, K. Raximova, and B. Khursandova, "Enhancement of energy-efficient cleaning equipment," *AIP Conference Proceedings* **3331**, 050007 (2025). <https://doi.org/10.1063/5.0307149>
9. F. Sultonova, O. Toshbekov, M. Urozov, N. Boymurova, Z. Mustanova, and I. Boltaeva, "Enhancing and evaluating the characteristics of specialized workwear for employees in the electric power supply sector," *AIP Conference Proceedings* **3331**, 050006 (2025). <https://doi.org/10.1063/5.0306350>
10. S. U. Mustafaeva, "Lexicographic interpretation of meronyms in Uzbek and English languages," in *The Role of Women in the Development of Science and the Spiritual and Educational Sphere: Problems and Solutions* (February 28, 2025).
11. S. U. Mustafaeva, "Uzbek and English dialects as examples illustrating problems of vocabulary formation in meronymy," *American Journal of Education and Evaluation Studies* **2**(5), 1 (2025). E-ISSN: 2997-9439.
12. O. Materinska, "Semantic relation of meronymy in languages of different structure (case study of body part names)," Taras Shevchenko National University of Kyiv (2019), p. 256.
13. D. A. Kolodko, "Meronymic relations as a manifestation of lexical systematization," *Russian Language at School* **2** (1971) (in Russian).
14. V. P. Zakharov, *Corpus Linguistics* (Teaching Aid, Saint Petersburg, 2005), p. 3 (in Russian).
15. N. V. Kuzmina, "Meronymic structures for names denoting parts of living beings in English," Minsk State Linguistic University (academic work).
16. M. V. Nikitin, *Foundations of the Linguistic Theory of Meaning* (Vysshaya Shkola, Moscow, 1988) (in Russian).
17. E. Begmatov, H. Ne'matov, and R. Rasulov, "Lexical microsystem and its research methodology," *Uzbek Language and Literature* **6**, 35–40 (1989) (in Uzbek).
18. ScienceWeb Uzbekistan, publication database, available at: https://api.scienceweb.uz/storage/publication_files/1535/12165/64db3b7cc6ac6
19. CyberLeninka open scientific library, <https://cyberleninka.ru>
20. Biblioteka Nauki, scientific article repository, <https://bibliotekanauki.pl/articles/2117902.pdf>
21. ResearchGate publication database, <https://www.researchgate.net/publication/334309725>
22. *American Journal of Education and Evaluation Studies*, article archive, <https://semantjournals.org/index.php/AJEES/article/view/1636>
23. Scientific conference materials repository, https://ilmiyanjumanlar.uz/uploads/conferences/0068/68_i_20250307_211356_4.14.pdf
24. *Longman Lexicon of Contemporary English* (Longman, London, 1981).
25. *Webster's Third New International Dictionary of the English Language* (Merriam-Webster, Springfield, MA, 1961).
26. *Oxford English Dictionary* (Oxford University Press, Oxford, 2025).
27. *Longman Language Activator* (Longman, London, 1993).
28. *Cambridge International Dictionary of English* (Cambridge University Press, Cambridge, 1995).
29. *WordNet: Lexical Database for English* (Princeton University).
30. *Explanatory Dictionary of the Uzbek Language*, Vol. 5 (Tashkent, 2021).
31. Uzbek lexical corpus systems: *Imlo.uz* and *Synonym.uz*.
32. Mahmutkhonov S., Baizhonova L., Mustayev R., Tashmatova S. Dynamic analysis of voltage-ampere characteristics and harmonic distortions in electric arc furnaces. // *AIP Conference Proceedings*. 3331(1), 2025. pp. 070023, 1–5. <https://doi.org/10.1063/5.0305745>.
33. Bobojanov M., Mahmutkhonov S. Influence of the consumer to power quality at the point of connection // *E3S Web of Conferences* 384. 2023. PP. 01041, 1-5. <https://doi.org/10.1051/e3sconf/202338401041>.
34. Bobojanov M.K., Karimov R.Ch., Popkova O.S., Tuychiev F.N., Makhmutkhanov S.K. Analysis of the results of experimental studies of the arc furnace DSP-30. // *Power Engineering Research & Technology*. 27(2), 2025. pp. 126–137. <https://doi.org/10.30724/1998-9903-2025-27-2-126-137>

35. Reymov K.M., Makhmuthonov S.K., Turmanova G., Uzaqbaev Q. Optimization of electric networks modes under conditions of partial uncertainty of initial information // E3S Web of Conferences 289, 07023 (2021). -2021, pp: 1-4, <https://doi.org/10.1051/e3sconf/202128907023>.
36. R. K. Kurbaniyazov, A. M. Reimov, A.T. Dadakhodzhaev, Sh. S. Namazov, B. M. Beglov. Nitrogen-phosphoric fertilizers produced by introduction of Central Kyzylkum phosphate raw material into ammonium nitrate melt. Russian Journal of Applied Chemistry. Russ J Appl Chem (2007) 80(11): 1984-88. <https://doi.org/10.1134/S1070427207110456>
37. Namazov, Sh.S., Kurbaniyazov, R.K., Reimov, A.M., Beglov, B.M. Hardness of the granules of ammonium nitrate doped with the Central Kyzylkum Phosphorite. Russian Journal of Applied Chemistry. Russ J Appl Chem (2007) 81(6): 1103–1106. <http://dx.doi.org/10.1134/s1070427208060402>.
38. Kurbaniazov, R.K., Reimov, A.M., Namazov, Sh.S., Beglov, B.M. Nitrogen-phosphoric fertilizers obtained by interaction of the concentrated solutions of ammonium nitrate with the mineralized mass of the phosphorites of Central Kyzylkum. Russian Journal of Applied Chemistry. Russ J Appl Chem (2009) 82: 1123. <https://link.springer.com/journal/11167>
39. Alimov, U.K., Reimov, A.M., Namazov, Sh.S., Beglov, B.M. The insoluble part of phosphorus fertilizers, obtained by processing of phosphorites of central kyzylkum with partially ammoniated extraction phosphoric acid. Russian Journal of Applied Chemistry. Russ J Appl Chem (2010) 83(3): 545–552. <https://doi.org/10.1134/S107042721030328>
40. Reymov, A.M., Namazov, S.S., Beglov, B.M. Effect of phosphate additives on physical-chemical properties of ammonium nitrate. Journal of Chemical Technology and Metallurgy 2013 48(4), 391-395. <http://dl.uctm.edu/journal/>
41. Urishev, B., Fakhridin Nosirov, and N. Ruzikulova. 2023. "Hydraulic Energy Storage of Wind Power Plants." E3S Web of Conferences, 383. <https://doi.org/10.1051/e3sconf/202338304052>
42. Urishev, B., S. Eshev, Fakhridin Nosirov, and U. Kuvatov. 2024. "A Device for Reducing the Siltation of the Front Chamber of the Pumping Station in Irrigation Systems." E3S Web of Conferences, 274. <https://doi.org/10.1051/e3sconf/202127403001>
43. Turabdjanyov, S., Sh. Dungboyev, Fakhridin Nosirov, A. Juraev, and I. Karabaev. 2021. "Application of a Two-Axle Synchronous Generator Excitations in Small Hydropower Engineering and Wind Power Plants." AIP Conference Proceedings. <https://doi.org/10.1063/5.0130649>
44. Melikuziev M.V. Determination of the service area and location of transformer substations in the city power supply system. E3S Web of Conferences 384, 01033 (2023) RSES 2022. <https://doi.org/10.1051/e3sconf/202338401033>
45. Melikuziev M.V., Usmonaliev S., Khudoyberdiev N., Sodikov J., Imomaliev Z. Issues of the design procedure for the power supply system. AIP Conference Proceedings 3152, 040031 (2024). <https://doi.org/10.1063/5.0218873>
46. Melikuziev M.V., Fayzrakhmanova Z., Akhmedov A., Kasimova G. Development of an Educational Simulator's Working Logic for the Course 'Fundamentals of Power Supply'. AIP Conference Proceedings 3152, 050025 (2024). <https://doi.org/10.1063/5.0218875>
47. Melikuziev M.V., Nematov L.A., Novikov A.N., Baymuratov K.K. Technical and economic analysis of parameters of city distribution electric network up to 1000 V. E3S Web of Conferences 289, 07016 (2021) Energy Systems Research. <https://doi.org/10.1051/e3sconf/202128907016>
48. L.Jing, J.Guo, T.Feng, L.Han, Z.Zhou and M.Melikuziev, "Research on Energy Optimization Scheduling Methods for Systems with Multiple Microgrids in Urban Areas," 2024 IEEE 4th International Conference on Digital Twins and Parallel Intelligence (DTPI), Wuhan, China, 2024, pp. 706-711, <https://ieeexplore.ieee.org/abstract/document/10778839>
49. Shukhrat Umarov, Murot Tulyaganov. Peculiarities of simulation of steady modes of valve converters with periodic power circuit structure. III International Scientific and Technical Conference "Actual Issues of Power Supply Systems" (ICAIPSS2023). AIP Conf. Proc. 3152, 050004-1–050004-7; <https://doi.org/10.1063/5.0218869>
50. Murot Tulyaganov, Shukhrat Umarov. Improving the energy and operational efficiency of an asynchronous electric drive. III International Scientific and Technical Conference "Actual Issues of Power Supply Systems" (ICAIPSS2023); <https://doi.org/10.1063/5.0218876>
51. Shukhrat Umarov, Khushnud Sapaev, Islambek Abdullabekov. The Implicit Formulas of Numerical Integration Digital Models of Nonlinear Transformers. AIP Conf. Proc. 3331, 030105 (2025); <https://doi.org/10.1063/5.0305793>
52. Shukhrat Umarov, Murat Tulyaganov, Saidamir Oripov, Ubaydulla Boqijonov. Using a modified laplace transform to simulate valve converters with periodic topology. AIP Conf. Proc. 3331, 030104 (2025); <https://doi.org/10.1063/5.0305792>
53. Murat Tulyaganov, Shukhrat Umarov, Islambek Abdullabekov, Shakhnoza Sobirova. Optimization of modes of an asynchronous electric drive. AIP Conf. Proc. 3331, 030084 (2025); <https://doi.org/10.1063/5.0305786>

54. Islombek Abdullabekov, Murakam Mirsaidov, Shukhrat Umarov, Murot Tulyaganov, Saidamirkhon Oripov. Optimizing energy efficiency in water pumping stations: A case study of the Chilonzor water distribution facility; AIP Conf. Proc. 3331, 030107 (2025); <https://doi.org/10.1063/5.0305780>
55. Ma'ruf, K., Tursoat, A., Dilnavoz, K., Bekmurodjon, R., Ra'no, A., Saida, T., ... & Toshbekov, B. (2025). ZnO Nanoparticles Incorporated on Multi-Walled Carbon Nanotubes as A Robust Heterogeneous Nano-catalyst for Biodiesel Production from Oil. Journal of Nanostructures, 15(3), 1050-1060.