



1-rasm

O’tkazilgan tajribalar natijasida olingan ma’lumotlar 1-rasmda keltirilgan egri chiziq orqali tasvirlangan bo’lib, unda σ –m bog’lanish grafigi aniq maksimum nuqtaga ega. Ushbu maksimum 0.20 g atrofida kuzatilib, bu sohada ionlarning harakatchanligi eng yuqori darajada ekanligini ko’rsatadi. Natijalar shuni tasdiqlaydiki, aynan shu diapazonda **PEO–PC–EC/ammoniy yodid** asosidagi polimer elektrolit o’zining eng yuqori elektr o’tkazuvchanlik xususiyatlarini namoyon etadi. Bunda tuz massasi ion transporti mexanizmlariga bevosita ta’sir ko’rsatadi, chunki optimal massada ionlar o’rtasidagi ta’sir kuchlari muvozanat holatida bo’ladi. 0.15–0.20 g diapazoni eng maqbul soha sifatida qayd etildi, bu oraliqda elektrolitning struktura barqarorligi saqlanadi va fotoelektrik samaradorlik sezilarli darajada oshadi, bu esa DSSC tizimlarida qo’llash uchun eng qulay sharoit yaratadi.

Xulosa

O’tkazilgan tadqiqotlar shuni ko’rsatdiki, PEO–PC–EC/ammoniy yodid asosidagi polimer elektrolitlarda ion o’tkazuvchanlik tuz massasiga ancha sezilarli bog’liqdir. Ammoniy yodid (NH_4I) miqdori ortishi bilan dastlab elektrolit ichidagi ion zichligi oshadi va bu o’tkazuvchanlikning yaxshilanishiga olib keladi. Biroq tajribalar 0.25 g dan yuqori massa qiymatlarida ion juftlanish va klaster hosil bo’lishi kuzatilishini ko’rsatdi; natijada ionlarning erkin diffuziyasi cheklanib, umumiy o’tkazuvchanlik kamayadi. Eksperimental ma’lumotlarga ko’ra, 0.15–0.20 g oraliq’i elektrolit uchun optimal deb topildi, bu diapazonda maksimal o’tkazuvchanlik $\approx 2.4 \times 10^{-5} \text{ S} \cdot \text{cm}^{-1}$ ga teng. Ushbu natijalar polimer elektrolit tarkibini optimallashtirish va barqaror ishlovchi DSSC tizimlarini yaratishda muhim amaliy yo’l-yo’riq beradi. Shuningdek, bu diapazon elektrolitning strukturaviy barqarorligini ta’minlab, fotoelektrik konversiya samaradorligini oshirishga yordam beradi. Kelajakda uzoq muddatli barqarorlik va haroratga bog’liqlikni o’rganish orqali tizimni yanada optimallashtirish maqsadga muvofiqdir va qo’shimcha tadqiqotlar zarur.

Foydalanilgan adabiyotlar

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THE HISTORY OF THE ORIGIN OF THE UZBEK AND AZERBAIJANI LANGUAGES

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Abstract: This article explores the historical origins and development of the Uzbek and Azerbaijani languages within the framework of the Turkic language family. It examines the linguistic



evolution of both languages from their ancient Turkic roots to their modern standardized forms. The paper highlights key historical periods, including the early Karluk-Uyghur foundation of Uzbek and the Oghuz dialectal base of Azerbaijani, as well as the influence of major literary figures such as Alisher Navoi and Muhammad Fuzuli. Through comparative analysis, it identifies structural and typological similarities between Uzbek and Azerbaijani, including agglutinative morphology, vowel harmony, and SOV word order. Despite differences in phonetics and external influences, both languages have retained their Turkic essence and continue to evolve as symbols of national identity and cultural unity in the modern era.

Keywords: Uzbek language; Azerbaijani language; Turkic languages; linguistic history; Karluk branch; Oghuz branch; Alisher Navoi; Muhammad Fuzuli; Chagatai Turkic; language development; comparative linguistics; national identity.

O‘ZBEK VA OZARBAYJON TILLARINING KELIB CHIQISH TARIXI

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Annotatsiya: Ushbu maqolada o‘zbek va ozarbayjon tillarining tarixiy kelib chiqishi hamda rivojlanish jarayoni turkiy tillar oilasi doirasida tahlil qilinadi. Unda har ikki tilning qadimgi turkiy ildizlardan boshlab zamonaviy adabiy shakllargacha bo‘lgan til taraqqiyoti o‘rganiladi. Tadqiqot davomida o‘zbek tilining qadimgi qarluq–uyg‘ur asoslari va ozarbayjon tilining ogh‘uz lahja bazasi, shuningdek, Alisher Navoiy va Muhammad Fuzuliy kabi buyuk adabiy siymolarning ta’siri yoritiladi. Qiyosiy tahlil orqali o‘zbek va ozarbayjon tillarining tuzilma va tipologik o‘xshashliklari — agglutinativ morfologiya, unli uyg‘unligi va SOV so‘z tartibi — aniqlanadi. Fonetik farqlar va tashqi ta’sirlarga qaramay, har ikki til o‘zining turkiy mohiyatini saqlab qolgan bo‘lib, bugungi kunda ham milliy o‘zlik va madaniy birlik timsoli sifatida rivojlanishda davom etmoqda.

Kalit so‘zlar: o‘zbek tili; ozarbayjon tili; turkiy tillar; til tarixi; qarluq tarmog‘i; ogh‘uz tarmog‘i; Alisher Navoiy; Muhammad Fuzuliy; chig‘atoy tili; til rivoji; qiyosiy tilshunoslik; milliy o‘zlik.

ИСТОРИЯ ПРОИСХОЖДЕНИЯ УЗБЕКСКОГО И АЗЕРБАЙДЖАНСКОГО ЯЗЫКОВ

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Аннотация: В данной статье рассматриваются историческое происхождение и развитие узбекского и азербайджанского языков в рамках тюркской языковой семьи. Анализируется эволюция обоих языков — от древнетюркских корней до современных литературных форм. Особое внимание уделяется карлукско-уйгурской основе узбекского языка и огузской диалектной базе азербайджанского, а также влиянию выдающихся литературных деятелей, таких как Алишер Навои и Мухаммед Физули. В результате сравнительного анализа выявлены структурные и типологические сходства узбекского и азербайджанского языков — агглютинативная морфология, гармония гласных и порядок слов SOV. Несмотря на различия в фонетике и внешние влияния, оба языка сохранили свою тюркскую сущность и продолжают развиваться как символы национальной идентичности и культурного единства в современную эпоху.

Ключевые слова: узбекский язык; азербайджанский язык; тюркские языки; история языка; карлукская ветвь; огузская ветвь; Алишер Навои; Мухаммед Физули; чагатайский язык; развитие языка; сравнительное языкознание; национальная идентичность.

Introduction

Language is one of the most essential components of national identity and cultural continuity. It serves as both a means of communication and a repository of collective memory, embodying a people’s worldview, traditions, and intellectual heritage. The Uzbek and Azerbaijani languages, spoken respectively in Central Asia and the South Caucasus, are prominent members of the Turkic language family. Despite



being separated geographically, they share deep linguistic roots, a common ancestral language, and numerous structural similarities derived from ancient Turkic.

The study of the historical origins of these two languages provides valuable insights into the ethnogenesis of the Uzbek and Azerbaijani peoples, as well as the broader historical processes that shaped the linguistic and cultural unity of the Turkic world. This paper explores the origin, development, and current state of the Uzbek and Azerbaijani languages through a historical and comparative perspective.

Main Body

The Turkic languages form one of the largest language families in Eurasia, spoken by over 180 million people across a vast region extending from Eastern Europe to Western China. Linguists generally classify the Turkic languages into six major branches: Oghuz, Karluk, Kipchak, Siberian, Yakut, and Chuvash (the latter being the most divergent).

The earliest evidence of a written Turkic language dates back to the 8th century, found in the Orkhon-Yenisey inscriptions in present-day Mongolia. These inscriptions, written in the Old Turkic script, represent the earliest recorded form of the Common Turkic language — the linguistic ancestor of both Uzbek and Azerbaijani.

Over the centuries, as Turkic tribes migrated and established states across Central Asia, the Middle East, and the Caucasus, the Common Turkic language diversified into regional dialects and eventually evolved into the distinct branches and languages we recognize today.

The Uzbek language belongs to the Karluk branch of the Turkic family. Its earliest roots can be traced to the Karluk, Chigil, and Uyghur dialects spoken in the 9th–12th centuries. These dialects flourished in regions around Kashgar, Balasaghun, and the Syr Darya valley, forming the linguistic base for what is often called Old Turkic or Karahanid Turkic.

During this period, monumental works such as Yusuf Khash Hajib’s “Kutadgu Bilig” (“Wisdom of Royal Glory”) and Mahmud al-Kashgari’s “Divanu Lug’at at-Turk” (“Compendium of the Turkic Dialects”) were produced. These texts not only document the vocabulary and grammar of early Turkic dialects but also mark the first major attempts to codify the Turkic linguistic tradition.

By the 13th century, the Mongol conquests and the subsequent formation of the Chagatai Khanate created favorable conditions for the emergence of a new literary language — Chagatai Turkic (Old Uzbek). The Chagatai language became the lingua franca of Central Asia from the 14th to the 17th centuries.

The greatest representative of this language was Alisher Navoi (1441–1501), whose literary and theoretical works, especially Muhakamat al-Lug’atayn (“The Comparison of Two Languages”), elevated Chagatai Turkic to the level of a refined literary and cultural medium. Navoi demonstrated that Turkic, and specifically Uzbek, could express philosophical, poetic, and scholarly ideas as effectively as Persian or Arabic.

From the 18th to the 20th centuries, the Uzbek language underwent significant transformations under the influence of Persian, Arabic, and Russian. During the Soviet period, language policies led to the adoption of various scripts: Arabic (before 1929), Latin (1929–1940), and Cyrillic (1940–1993). Since 1993, independent Uzbekistan has reintroduced the Latin-based script, emphasizing national linguistic identity and modernization.

Today, Uzbek is the official state language of Uzbekistan and is spoken by more than 35–40 million people worldwide. It continues to develop dynamically in science, technology, media, and education.

The Azerbaijani language belongs to the Oghuz branch of the Turkic languages, which also includes Turkish, Turkmen, and Gagauz. The Oghuz tribes originally inhabited regions in Central Asia but migrated westward during the 9th–11th centuries, settling in Iran, Anatolia, and the South Caucasus.

Under the Seljuk Empire (11th–12th centuries), Oghuz Turkic became widely spoken across the Middle East. The dialects used by these tribes laid the foundation for what would later develop into modern Turkish and Azerbaijani.

From the 13th to 16th centuries, Azerbaijani evolved into a distinct literary language. The works of prominent poets such as Nizami Ganjavi, Khaqani Shirvani, Imadaddin Nasimi, and Muhammad Fuzuli enriched the vocabulary, syntax, and stylistic potential of Azerbaijani. Fuzuli’s poetry, written in both Azerbaijani and Persian, exemplifies the high literary capacity of the Turkic language during the Safavid era.

During the 19th century, the Azerbaijani language became a central symbol of national awakening and identity. The rise of printing presses in Baku and Ganja, the publication of newspapers, and the establishment of literary societies promoted the use of Azerbaijani in education and culture.



In the Soviet period, Azerbaijani was standardized and developed further under the Cyrillic alphabet, but after Azerbaijan’s independence in 1991, the Latin alphabet was officially restored. Today, Azerbaijani is the state language of the Republic of Azerbaijan, spoken by over 30 million people worldwide (including in Iran, Turkey, and the Caucasus).

Although Uzbek and Azerbaijani belong to different branches of the Turkic family (Karluk and Oghuz respectively), they share fundamental typological similarities in phonology, morphology, and syntax.

Both are agglutinative languages, meaning they form words and grammatical relations by adding suffixes to a root. They exhibit vowel harmony, SOV (subject-object-verb) word order, and an absence of grammatical gender.

Word	Uzbek	Azerbaijani	Meaning
Kitob	Kitab	Kitab	Book
Suv	Su	Su	Water
Yurak	Ürək	Ürək	Heart
Yil	İl	İl	Year
Odam	Adam	Adam	Human

Differences arise mainly in phonetics and lexical borrowings. Azerbaijani has absorbed more Persian and Arabic vocabulary due to its geographic proximity to Iran, while Uzbek retains stronger Central Asian features and a richer blend of Persian, Arabic, and Russian elements.

Both Uzbek and Azerbaijani have achieved full functional and institutional status as state languages of independent republics. They are taught at all levels of education, used in government, literature, science, and media, and have vibrant diasporas promoting their use globally.

In recent decades, both languages have undergone modernization and digitalization, with expanding terminology in fields like information technology, medicine, and law. Moreover, cultural and linguistic cooperation between Uzbekistan and Azerbaijan — including joint academic projects and literary exchanges — contributes to strengthening the unity of the Turkic-speaking world.

Conclusion

The Uzbek and Azerbaijani languages share a common Turkic heritage that dates back over a millennium. Despite their separate geographical and political trajectories, both languages have preserved their core grammatical structures and typological features inherited from ancient Turkic.

Their evolution reflects not only linguistic change but also the historical experiences, migrations, and cultural exchanges of their respective peoples. Today, as both nations strengthen their independent identities, the Uzbek and Azerbaijani languages stand as living symbols of resilience, cultural pride, and unity within the broader Turkic world.

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