Due to the scarcity of written sources for the period of the beginnings of the Polish state meant that until recently the dating of buildings erected between the tenth and the first half of the thirteenth century was based mainly on data provided by archaeological stratigraphy and comparative analysis of spatial arrangements and style features. The poor state of preservation of a significant number of buildings greatly limits the effectiveness of classical methods. Hence the interest of the scientific community in attempting to determine the time of construction of buildings through the use of absolute chronology methods. A precise possibility of determining the time of construction of architectural objects is offered by mortar dating. Mortar dating can be an important chronological key in archaeology because, unlike wood and charcoal, it is accessible for research.

The main aim of the research is to clarify the dating of key objects of Polish architecture from the period of the Piast dynasty using the latest Positive Ion Mass Spectrometer (PIMS), which allows samples to be measured as CO2 without the need for graphite.

The criteria for the selection of the research material were based on the chronological affiliation of the objects to early and medieval architecture, most of which had not yet been studied using absolute dating methods, or had been studied to a limited extent. Eighteen sites located in historic districts were selected for the study: Malopolska and Lower Silesia, representing the corpus of architecture in the period from the 10th to the 13th century. In Kraków, these are the early Romanesque buildings of Wawel: the rotunda of St Felix and St Adaukt, the church of St Gereon, the so-called Hall on 24 pillars, rotunda "B", and the churches of St Adalbert and Most Holy Salvatore, as well as the Benedictine Abbey in Tyniec with the church of Sts. The Benedictine Abbey in Tyniec with the churches of St. Peter and St. Paul, the vicarage at the church of St. Bartholomew in Morawica with extensive relics of the Romanesque palace, the unique monuments of Wiślica, such as the Romanesque churches of St. Nicolas, St. Nicholas and St. John the Baptist. Trinity (with the famous engraved Orant Plate) and the Basilica of the Blessed Virgin Mary, the churches in Jędrzejów, Prandocin and Siewierz, the Dominican monastery in Sandomierz, the palace with a rotunda in Przemyśl, the presumed - almost completely preserved magnate palace of Piotr Włost in Sobótka Górka in the massif of Ślęża and relics of the northern defence tower, and finally the residential tower in Siedlęcin (dendrochronologically dated to 1314 AD).

In the first stage of the research, laboratory tests will be carried out on the composition of the mortars (UAM Poznań). A preparation line (AGH Krakow) will be set up to obtain several CO_2 fractions. By directly transferring the individual CO_2 temperature fractions to the $^{14}C/^{12}C$ isotope ratio spectrometer PIMS, radiocarbon dating will be possible without a graphitisation step. This has the positive effects of reducing research costs and excluding possible contamination during sample preparation. The results obtained will allow the precise dating of objects, which will be important for the study of the beginnings of the Polish state and its multiple links with civilisation and building arts in Europe.