Fire and water reveal new archaeological dating method - Radiocápsula RCP/CPR. [1]

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Calificación:

Eurekalert - A team from The University of Manchester and The University of Edinburgh has discovered a new technique which they call 'rehydroxylation dating' that can be used on fired clay ceramics like bricks, tile and pottery. Working with The Museum of London, the team has been able to date brick samples from Roman, medieval and modern periods with remarkable accuracy. They have established that their technique can be used to determine the age of objects up to 2,000 years old – but believe it has the potential to be used to date objects around 10,000 years old. The exciting new findings have been published online today (20 May 2009) by the Proceedings of the Royal Society A. The method relies on the fact that fired clay ceramic material will start to chemically react with atmospheric moisture as soon as it is removed from the kiln after firing. This continues over its lifetime causing it to increase in weight – the older the material, the greater the weight gain. In 2003 the Manchester and Edinburgh team discovered a new law that precisely defines how the rate of reaction between ceramic and water varies over time. The application of this law underpins the new dating method because the amount of water that is chemically combined with a ceramic provides an 'internal clock' that can be accessed to determine its age. The technique involves measuring the mass of a sample of ceramic and then heating it to around 500 degrees Celsius in a furnace, which removes the water. The sample is then monitored in a super-accurate measuring device known as a microbalance, to determine the precise rate at which the ceramic will combine with water over time. Using the time law, it is

possible to extrapolate the information collected to calculate the time it will take to regain the mass lost on heating – revealing the sample's age. Lead author Dr Moira Wilson, Senior Lecturer in the School of Mechanical, Aerospace and Civil Engineering (MACE), said: "These findings come after many years of hard work. We are extremely excited by the potential of this new technique, which could become an established way of determining the age of ceramic artefacts of archaeological interest. "The method could also be turned on its head and used to establish the mean temperature of a material over its lifetime, if a precise date of firing were known. This could potentially be useful in climate change studies. As well as the new dating method, there are also more wide-ranging applications of the work, such as the detection of forged ceramic." The three-year £100,000 project was funded by the Leverhulme Trust, with the microbalance - which measures mass to 1/10th of a millionth of a gram – funded by a £66,000 grant from the Engineering and Physical Science Research Council (EPSRC). Researchers are now planning to look at whether the new dating technique can be applied to earthenware, bone china and porcelain. For more information please contact Alex Waddington, Media Relations Officer, the University of Manchester, 0161 275 8387 / 07717 881569 (alex.waddington@manchester.ac.uk [2]) The paper, entitled 'Dating fired-clay ceramics using long-term power-law rehydroxylation kinetics' has been published online and is due to appear in a future edition of Proceedings of the Royal Society A. A copy of the paper is available on request. The full research team comprised Dr Moira Wilson, Dr Margaret Carter, Prof William Hoff, Ceren Ince, Shaun Savage and Bernard McKay from The University of Manchester, Professor Chris Hall from the School of Engineering and Centre for Materials Science and Engineering at The University of Edinburgh and Ian Betts from The Museum of London. The Canterbury Archaeological Trust provided additional samples and information for the study while Ibstock Brick Ltd provided kiln-fresh bricks.

Links
[1] https://www.cienciapr.org/en/external-news/fire-and-water-reveal-new-archaeological-dating-method-radiocapsula-rcpcpr?language=en [2] mailto:alex.waddington@manchester.ac.uk