Since some years the European Commission has adopted a strategy for tackling the issue of sustainable access to raw materials, as it is crucial to the competitiveness and growth of the EU economy and to the objectives of the Europe 2020 strategy. The Commission also regularly publishes an updated list of critical raw materials in the EU, defined critical for a combination of high economic importance to the EU with a high risk associated with their supply. This is the premise of the project “Solutions for Critical Raw Materials Under Extreme Conditions”, funded by the COST Association and Horizon 2020, with a very broad partnership (27 Countries, all European and Israel), and coordinated by the Università Politecnica delle Marche. The list of the critical raw materials is too wide to be tackled together from the scientific point of view - explain Pr. Maria Letizia Ruello and Dr. Giovanna Cecchi, who oversee the project -.

So we have selected the critical raw materials required for the production of the high-tech materials, that can work in the extreme conditions of temperature, pressure, corrosion, friction, and wear that occurs in several industries, such as energy production plants, machinery manufacturing and transportation. The project, started in March 2016 and going on till 2020, aims to the construction and exploitation of a network of researchers – at now 170 already involved – that in their own institutes already worked on one of the project challenge, and that now will be coordinated on a common goal with a plurality of approaches to give sustainable solutions to the problem: doing more with less.

“Strategically - Ruello and Cecchi say - we have separated the work in two sectors: to design steel alloys equally resistant, or protect them with coatings. An example may help to understand: as is known, the presence of Chromium makes the steel alloys corrosion resistant. Chromium is a critical raw material: so we have to substitute it or reduce its content, and we need of alternative materials. Practically the researchers involved in the network are coordinated in four working groups, that take on the issue with different approaches; the first group studies why a particular element is so fundamental for the performances of a material; the second group, on the base of the knowledges of the first one, designs alternative materials; once found an alternative material, the third group develops the industrial process. Finally, the fourth group deals with the environmental and economic sustainability, including recycling issues, with a circular economy approach. After only one year of work the coordinators are satisfied: “The state of the art has been acquired, and we have some solution to be exploited. We are ready for the cooperation with the enterprises, believing to a higher involvement on them with the goal to increase this innovation circle.”