

*“- And what will they burn instead of coal?*

*- Water, replied Harding.*

*-Water! - cried Pencroft, - water as fuel for steamers and engines! Water to heat water!*

*- Yes, but water decomposed into its primitive elements - replied Cyrus Harding - and decomposed doubtless, by electricity, which will then have become a powerful and manageable force, for all great discoveries, by some inexplicable laws, appear to agree and become complete at the same time. Yes, my friends, I believe that water will one day be employed as fuel, that hydrogen and oxygen which constitute it, used singly or together, will furnish an inexhaustible source of heat and light, of an intensity of which coal is not capable. Someday the coalrooms of steamers and the tenders of locomotives will, instead of coal, be stored with these two condensed gases, which will burn in the furnaces with enormous calorific power. There is, therefore, nothing to fear. As long as the earth is inhabited it will supply the wants of its inhabitants, and there will be no want of either light or heat as long as the productions of the vegetable, mineral or animal kingdoms do not fail us. I believe, then, that when the deposits of coal are exhausted we shall heat and warm ourselves with water. Water will be the coal of the future.”*

Jules Verne, “The mysterious island” 1894

Hydrogen is lightest element in nature. When it is burned the only product is water and huge amount of energy is released. Energy which is produced from 1kg of hydrogen during this reaction is sufficient for boiling about 450 liters of water. The main problem lays in effective production of hydrogen, that’s why prophecy of Jules Verne has not yet fulfilled. To solve this problem new and efficient catalysts, that will make it easier to produce hydrogen, are needed.

Aim of this project is examination of electrochemical water decomposition to gaseous hydrogen using new catalysts, alloy coatings of nickel and rare earth metals deposited on steel substrate.

Do we ever replace fossil fuels with the hydrogen? Probably yes, but it certainly cannot be achieved without the discovery of new efficient catalysts.