Cold Nuclear Transmutations
Light Atomic Nuclei Binding Energy

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Several authors predict that α particle structures could be present in atomic nuclei. Convincing arguments of such structures are provided by systematics of the binding energies of the even-even nuclei with equal number of protons and neutrons. In that hypothesis, it is necessary to consider the binding energy of α particle as well as the binding energy between several α particles in order to determine the binding energy of a given nucleus.

The kind of binding energy existing within each α particle is a first point to consider. How to relate that binding energy to the deuterium binding energy, as well as to the tritium and He3 ones as these exist before the α particle is constituted? Also, could these structures be found within the nucleus as substructures linking the nucleons of one α particle with the nucleons of another α particle?

It will be shown that the hypothesis of α structures in the n-α nuclei can indeed describe the binding energy systematics. In such an approach the system in its ground state behaves like a crystal, with stationary configuration and shape and with defined bond values between the various α particles. The examples provided are O16, Ne20, Mg24, Si28, S32, Ar36 and Ca40.

The hypothesis I develop founds its background in the structure of neutron/proton as well as α particle I propose in my document posted on the internet one finds under www.philippehatt.com
According to that hypothesis the nuclei of the various elements are constituted out of α particles and other nucleons grouped in order to form sub nuclei bound together by four types of bonds called NN, NP, NNP, NPP.

The kinship which will be demonstrated between the binding energy distribution within the various nuclei is very important for LENR purposes, first because the difference between binding energies of the elements at the beginning and at the end of the LENR process determines the energy released, and second and more important because one can follow the shift between these binding energy distributions during the LENR process.

My purpose is not about looking for a new model of atomic structures. It is the reason I have favored a unidimensional approach trying to breakdown the binding energy value of each element and its isotopes in several clusters indicated above. As these clusters are 3 D structures the global structures are also 3 D, my binding energy approach looking only at unidimensional MeV values.