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PRODUCTION OF NUCLEAR ENERGY THROUGH DIFFERENT NUCLEAR REACTIONS

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Nuclear energy is a result of heat generated through the fusion and fission processes of atoms. Fusion reactions can release more energy than fission but are not man controlled reactions. The heat released in fission can be used to generate electricity in nuclear power plants. Uranium U-235 is one of the isotopes that fissions easily. During fission, U-235 atoms absorb loose neutrons. This causes U-235 to become unstable and split into two light atoms called fission products. A series of fissions is called a chain reaction. Although nuclear energy is considered as clean energy yet its inclusion in the renewable energy list is a subject of major debate. The different kinds of nuclear reactions based on their incident energies from few KeV to TeV and type of nuclei exhibit their importance in fundamental nuclear physics, nuclear astrophysics studies, transmutation of nuclear waste, medical application, accelerators, nuclear power plants, nuclear technology R&D, reactor design and safety consideration. New elements discovered during various fusion reactions mechanism are helpful for the treatment of various diseases. If the energy released in a nuclear reaction is very low i.e. of few KeV, these types of reactions are helpful to study the structure of a nucleus and its ground state properties or liquid state of nuclear matter. For the reactions with very high energy around few GeV to TeV, the nuclear matter become so hot and dense that it will produce hot quark gluon plasma which is again useful for the understanding of phase diagram of nuclear matter. The amount of energy released is represented as Q-value of the reaction which decides the type of the reaction. The future of nuclear energy depends on safe and efficient reactor designs.

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