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Treatment of residual water from a dairy plant for potential purposes

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The water is a very important natural resource for life in Earth. It is fundamental for several human activities, and more for the food industries, were we have the high consumption in dairy industries, the focus of this project. This present study was developed with the objective of proving the technical and financial viability of a model for reutilization of residual water from a dairy plant, through the coagulation with aluminum sulfate and disinfection with sodium hypochlorite. Thus, a data collection on water consumption and generation of effluents in the industry was carried out, as well the treatment of residual water through Jar-Test, followed by a physical-chemical and microbiological analyzes of water after treatment. The aluminum sulfate test was efficient in the residual water treatment, with a turbidity reduction efficiency of 97.6%. Also the disinfection test with sodium hypochlorite was efficient with the dosages of 1.0, 1.5 and 2.0 ppm and 30 minutes of contact time, which resulted in absence of total coliforms and Escherichia coli, for all samples. The studies parameters had good results to the treatment, which make new perspectives for the reuse of water in dairy plant, which makes possible to reduce the processing costs with the purchase of water and consequently less environmental impact to the water resources.

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On the theory of interaction potentials in ionic crystals (II): Applications to the thermodynamics of the elpasolite Cs2KLnCl6 crystals

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A rather complete and informative analysis of the intermolecular and intramolecular potentials is put forward with reference to the lanthanide type systems, such as Cs_2KLnCl_6, in the Fm3m, space group. The current study is focused on the trivalent lanthanide ions (Ln), characterized by atomic numbers in the atomic number interval: . A particular situation occurs in both extreme of the series, say for $_{58}Ce$:$[_{54}Xe]4f^{2}5d^{0}6s^{2}$ and $_{71}Lu$:$[_{54}Xe]4f^{14}5d^{1}6s^{2}$, respectively. The 13 trivalent lanthanide ions, moving along with the series from Ce^{+3} to Lu^{+3}, for these ions the 4f shell is not fully occupied and therefore the physical and chemical properties are indeed, somehow challenging and interesting to examine using structural, spectroscopic and theoretical methods and model calculations. We have elaborated some physical models and carried out a substantial amount of calculations, so as to estimate the reticular energy and also employing a thermodynamic Born-Haber cycle, we have been able to make some sound predictions and numerical estimation of heat formations for the above series of lanthanide type crystals. The calculated energy values associated with these observations seems to be most reasonable and these follow the expected trends, as may be anticipated from theoretical and experimental grounds. Both, the advantages and disadvantages of the current model calculation have been tested against other previous calculations performed. Some convergence tests as well as some master equations are employed to account for the various contributions to the total energy. The Born-Mayer-Buckingham potential is carefully examined with reference to these lanthanide type crystals Cs_2KLnCl_6. Finally, the most likely sources for improvement are carefully discussed.

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