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## Paper Title – Review of Agricultural Field in IOT technology

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## ABSTRACT

Smart farming, precision agriculture and Agriculture 4.0 all involve the integration of advanced technologies into existing farming architecture. The goal is to increase production efficiency and product quality, as well as reducing overall costs. To this end, the inclusion of Smart technologies into Irish agriculture has been inevitable with increased pressure being placed on farming practices to remain profitable, as well as adhere to environmental regulation.

Agricultural Internet of Things (IoT) has brought new changes to agricultural production. It not only increases agricultural output but can also effectively improve the quality of agricultural products, reduce labor costs, increase farmers' income, and truly realize agricultural modernization and intelligence. This paper systematically summarizes the research status of agricultural IoT. Firstly, the current situation of agricultural IoT is illustrated and its system architecture is summarized. Then, the five key technologies of agricultural IoT are discussed in detail. Next, applications of agricultural IoT in five representative fields are introduced. Finally, the problems existing in agricultural IoT are analyzed and a forecast is given of the future development of agricultural IoT

Keywords: IoT, IIoT, Agricultural IoT, System architecture, Key technology, IOT 4.0

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## Impact of Rare Earth (Ce3+& Y3+) on Structural, Optical, Morphological, and Magnetic Properties of Mn-Zn Spinel Nanoferrites

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## ABSTRACT

A series of spinel nanoferrite Mn0.5Zn0.5Fe2-xO4Rx (where R=Ce, Y, and x=0.00, 0.03, 0.06, 0.09, 0.12, 0.15) was synthesized using the co-precipitation method. The XRD, FTIR, VSM, and SEM-EDS techniques were used to explore the structural, morphological, optical, and magnetic characteristics of the samples. The XRD data confirmed the formation of a cubic spinel ferrite structure (Fd-3m space group). The crystalline size (17nm to 24 nm for Ce3+ and 17 nm to 19 nm for Y3+) and lattice constant (8.493 to 8.465 for Ce3+ and 8.500 A° to 8.479A° for Y3+) showed significant modification with rare earth substitution. The characteristic absorption bands in the range of 400-4000 cm-1 corresponding to spinel ferrite were observed by the FTIR technique. SEM analysis verified that the ferrite particles had an agglomerated, spherical shape. EDS spectra confirmed the presence of all inserted elements in the Mn0.5Zn0.5Fe2-xO4Rxcomposition. Using the M (H) hysteresis curve, the various magnetic properties of nanoparticles, including saturation magnetization, coercivity, remanence, and magnetic moment, were computed and analyzed in relation to structure and microstructure attributes. The saturation magnetization varies as cerium and yttrium concentration rises due to the structural alterations brought about by rare earth substitution and can be linked to changes in the A-B exchange interactions.The prepared spinel nanoferrites multidomain nature makes it a suitable material for electronics applications.

Keywords:Spinel Ferrites,Co-precipitation method, XRD, FTIR, SEM-EDS, VSM, Rare earth.