

## Preface

Perovskite are materials of the form  $ABO_3$ , other than "double perovskite" also have the same form.  $A_2BB'O_6 = ABO_3 \cdot AB'O_3$ , while A is either a rare earth or an alkaline earth and maintains the valence, B and B' are the electronically active ions and are usually 3d, 4d, or 5d elements. Since there are many different combinations of B and B's, there are also many possible electrical and magnetic phases. These materials are more effective and useful in a variety of devices, including memory sticks, magnetic recording media, magnetic sensors, and so on, due to the correlation of magnetic and electrical ordering at ambient temperature. According to previous research, the Co/Mn-based rare earth double perovskite ( $R_2CoMnO_6$ ; R = rare earth elements) demonstrates magnetic frustration, which causes various magnetic anomalies to emerge, such as re-entrant spin glass, low-temperature spin glass, cluster glass, multi-functionality, exchange bias, and meta-magnetism. The fascinating magnetic state in these double perovskites happens mainly by different Mn-O-Mn/Co-O-Mn/Co-O-Co exchange interactions as well as their interaction with rare-earth ions. For future results, they may be looking into different kinds of devices, especially spintronic types. Additionally, the best way to improve such attractive and special features and to prepare them for application in various practical applications is through rare earth elements and hole doping at the A site.

**Chapter 1**, The detailed introduction to magnetism and the categorization of magnetic materials based on their attraction/repulsion in an external magnetic field was explained. A brief introduction of the single perovskite and double perovskite, their different magnetic phases, and the physics of these systems have been elaborated in this chapter. Additionally, we discussed a variety of important magnetic phenomena here, including the Griffith phase, exchange-bias phenomenon, meta-magnetic phase, spin glass/cluster glass, dielectric measurement, etc. We present a literature survey on  $R_2CoMnO_6$ ,  $Pr_2CoFeO_6$ , and  $La_2CoFeO_6$

with their fascinating properties. Finally, we focused on the motives and objectives that led us to begin working on this specific system.

**Chapter 2,** We have discussed the sample preparation techniques as well as the many experimental methods and the fundamental theories that were applied to different measurements and characterizations in our research. Identification of structural, phase, and elemental chemical states has been accomplished by the use of X-ray diffraction measurement, Raman spectroscopy, and X-ray photoemission spectroscopy. The MPMS magnetometer has been thoroughly established, along with its operating principle, and is used for a variety of magnetization measurements.

**Chapter 3,** In this chapter some novel magnetic behaviors of the double perovskite  $\text{Eu}_2\text{CoMnO}_6$  (ECMO) have been described. The X-ray diffraction analysis confirms that it crystallized in a single pure orthorhombic phase with space symmetry Pnma. The x-ray absorption spectroscopy (XAS) analysis shows that the transition metal (Co and Mn) ions of the sample have a mixed valence state. The resistivity measurement shows the semiconducting nature of  $\text{Eu}_2\text{CoMnO}_6$ . Dielectric measurement shows an extrinsic Maxwell-Wegner-type polarization with a large dielectric constant at room temperature. The Cole-Cole plot shows a single semicircle. The analysis of the Cole-Cole plot and imaginary part of impedance again show the semiconducting nature of  $\text{Eu}_2\text{CoMnO}_6$ . The real part of impedance shows a high value at low temperature and frequency while it decreases at higher temperature and frequency due to increased mobility of charge carrier at higher temperatures. The magnetic property measurement shows a dominating ferromagnetic transition below 125 K. Further analysis shows that the system has a strong meta-magnetic state due to the coexistence of ferromagnetic (FM) and anti-ferromagnetic (AFM) ordering owing to the presence of antisite disorder and anti-phase boundary. The X-ray magnetic circular dichroism measurement also supports the coexistence of FM and AFM phases in  $\text{Eu}_2\text{CoMnO}_6$ .

**Chapter 4,** The structural and magnetic properties of the double perovskite  $\text{Pr}_{1.8}\text{La}_{0.2}\text{CoFeO}_6$  have been investigated. The X-ray diffraction study shows that the system acquires room-temperature orthorhombic phase with the  $\text{Pnma}$  space group. The X-ray photoemission spectroscopy (XPS) measurement confirmed that the B-site ions are present in mixed valence states i.e. the Co has been found in  $\text{Co}^{2+}$  and  $\text{Co}^{3+}$  valance states whereas Fe has been found in  $\text{Fe}^{3+}/\text{Fe}^{4+}$ . Magnetic measurements of the system confirm the existence of several fascinating magnetic behaviors, such as long-range canted antiferromagnetism with  $T_N \sim 271$  K, giant exchange bias, and re-entrant cluster glass phase ( $T_G \sim 33$  K). Field-dependent magnetization shows a large spontaneous exchange bias;  $H_{\text{SEB}} \sim 1.8$  kOe and giant conventional exchange bias,  $H_{\text{CEB}} \sim 2.4$  kOe at 5 K. Anti-ferromagnetic materials with large exchange bias can be utilized in high-density spintronic devices. Temperature-dependent Raman study demonstrates that the observed phonon mode exhibits anomalous behavior close to the magnetic transition temperature. Analysis of anomalous softening of phonon mode below  $T_N$  clarifies the presence of significant spin-phonon coupling while the magneto-striction effect does not play any significant role in the observed phonon anomaly. The presence of double glassy states, large exchange bias effect, and different magnetic phases make this system a potential candidate for spintronic applications.

**Chapter 5,** This chapter deals with the effect of spin frustration due to disorder present in  $\text{Y}_{1.5}\text{Ca}_{0.5}\text{CoMnO}_6$  double perovskite sample. The compound was investigated by X-ray. Diffraction, magnetic, and electrical properties. The resistivity measurement reveals its semiconducting nature which was explained by variable range hopping and small polaron hopping models. Eventually, the huge dielectric constant and the low tangent loss make the  $\text{Y}_{1.5}\text{Ca}_{0.5}\text{CoMnO}_6$  sample a promising candidate from the application point of view. A sample has long-range ordering below 180 K and at about 33 K it shows spins glass or cluster phase.

Above transition temperature, the Griffith phase arises in the sample due to the presence of a short-range cluster phase.

**Chapter 6,** In this chapter magnetic behaviors and electric of polycrystalline double perovskite  $Y_{2-x}Ca_xCoMnO_6$  ( $x = 0.05$  and  $0.10$ ) have been investigated. The resistivity measurement shows the semiconducting nature following the variable range and small polaron hopping mechanism. The temperature-dependent magnetization for both samples demonstrates a second-order phase transition around 70 K ( $x = 0.05$ ) and 68 K ( $x = 0.10$ ) respectively. Magnetic measurement demonstrates meta-magnetic behavior in both samples. Meta-magnetic properties in YCCMO10 decreased because of Ca doped at the Y site in  $Y_2CoMnO_6$ , Ca has a different oxidation state than Y, and so it affects magnetic interaction between Co and Mn. Ca also has a larger ionic radius than Y ion, so it obtains lattice deformation which affects magnetic properties, like meta-magnetic and Griffith phase.

**Chapter 7,** In this chapter, the conclusion of our research work that was presented in this thesis is divided into various sections. This chapter also includes a summary of the research that will be done in the future.

## **Extended Abstract**

The present thesis explains threefold objectives in its orientation. Firstly, it explores the elements of national features and traits that remain core to the imaginations of Tibetan refugees of India to develop their national identity and build a strong sense of attachment toward their identity. The research approaches the first objective from the perspective of social identity theory. It provides an in-depth understanding of the mechanism of identity-building activities and the identification process among Tibetan refugees from the state of exile. Secondly, it attempts to understand the refugee crisis among Tibetans living in India. The section mainly focuses on showing the deprivation state that Tibetans suffer from due to their refugee identity in India and its impact on their torn consciousness when it comes to the feeling of belonging and non-belonging. Lastly, it intends to understand how Tibetan refugees' feelings of nationalism and refugeehood are transformed into a collective purpose of freeing Tibet from the unjustified annexation of PRC rule. Further, the main focus of the third objective is to show how they exercise their nationalist intention in everyday life and the perceived rationale behind such actions. To conceptualise the third objective, we analyse the Tibetan refugees' narratives under mobilisation theories and finally propose the concept of 'everyday mobilisation' to better understand the mobilisation process of Tibetan refugees amid statelessness.

To address the objectives, the thesis adopted a qualitative research design that primarily relies on 35 in-depth semi-structured interviews with Tibetan refugees from the Bylakuppe settlement, Karnataka, the Pandoh Settlement, Mandi, Himachal Pradesh and the Tibetan refugees living in Sarnath, Varanasi, Uttar Pradesh. Our entire methodological approach is divided into these two methods. The ethnographic approach allows us to understand the contexts of sense-making and

practices and the cultural rules (Daly, 2007) that our participants must depend on to make meaning of their social life and political movement in a state of exile. Incorporating thematic analysis (Braun & Clarke, 2006) helped us observe the patterns of meaning in our initial codes, organise the data into basic themes, and finalise the defining themes. The subsequent pages provide a brief chapter of the present thesis and end with a discussion of the findings in concluding remarks.

**Chapter 1.** This chapter traces the theoretical and conceptual development of the nation, nationalism and national identity to understand its open-interpretative nature. It then discusses the cognitive and imaginative elements of the nation by using the social-psychological approach. These discussions highlight the nation's cognitive aspects that rely on the individuals' belief systems and can be exercised without state boundaries. It further progresses to validate these conceptions by discussing the social and psychological mechanism of 'nations without states' and how it sustains its existence through the process of identity construction. It shows that the construction of national identity is crucial for surviving cases in which nationalism is exercised on exiled lands or in statelessness. The key elements of such national identity often depend on the ethnic attributes of their traditional past. Through these arguments, the chapter explains the social identity theory and its relevance in the survival of the concept of nation, as well as the psychological transformation that it can inflict among the identifiers. Then, the chapter establishes the relationship between identity and mobilisation, which is essential for motivating individuals to come together and participate collectively in social or political movements. The discussion in such a particular direction led to the introduction of the case study of the present thesis, Tibet. The chapter also introduces the history of Tibet's political conflict, including the historical events that led the Dalai Lama and many others to the Tibetan diaspora. The following two sections provide a brief account of how Tibet's situation has reshaped the politics of India and China, as well as the

background of Tibetan refugees in India. The final section of this chapter introduces the intentions of the present work, which included understanding the everyday aspects of a mobilisation process among exiled Tibetan refugees by interpreting their voices using the key concepts in social identity theory and social psychological aspects of nationalism in diasporic situations.

**Chapter 2.** This chapter dives deeper into exploring multiple interpretations of Tibet as a mythical land, ethnographic boundary, and nation proposed by scholars from various disciplines, such as historians, sociologists, anthropologists, and political scientists. Such diverse exploration led the study to search for the research gap, to highlight the identity development process of Tibetan refugees in exile and to use the concept of everyday mobilisation to understand the Tibetan social movement in exile. This chapter also explores the resilience efforts of the Tibetans and the Indian government to reestablish the exiled community successfully. Further, it focuses on political activism that has emerged within the Tibetan diaspora, especially around issues of autonomy, human rights, and the preservation of Tibetan culture. It also highlights the role of the Tibetan Government-in-Exile, the efforts to gain international support for Tibet, and the influence of the uncontested national leader, the Dalai Lama. It then discusses the challenges and frustrations faced by the diaspora, particularly with regard to Tibet's political future and the relations between Tibetans and the Chinese government. Finally, the chapter examines the social-psychological mechanism of Tibetans' identity formation in exile. It uses social identity theory to provide a new perspective on the process of identity construction in cases of 'nations without states'. It illustrates the crucial role of ethnicity by taking examples from the Tibetan national identity development case. This chapter concludes by linking the ethnic identification process with the politicisation of such identities, which is explicitly evident in the case of Tibetans' mobilisation strategies in exile to achieve Tibet's sovereignty.

**Chapter 3.** This chapter begins with introducing the three folded objectives of the present thesis, which include examining the imaginative identification features of Tibetan national identity, exploring the feelings of refugeeness among the diasporic Tibetans, including its impact on the collective consciousness, and defining ways in which Tibetan refugees exercise their nationalist sentiments in everyday life and their justification process for such behaviours. The chapter then discusses the present study's methodological framework in great detail. It justifies how constructivism as a paradigm is relevant in the present context to understand the collective construction of the diasporic Tibetan reality, a product of the active cooperative enterprise of persons in relationships. The chapter then introduces the ethnographic approach adopted in the present work, which is mainly for collecting data. It explains that understanding how Tibetans interact with their imagined and lived realities in everyday life requires an ethnographic approach that includes extensive fieldwork, observation notes, building rapport with key informants or gatekeepers, and searching for meaning in their cultural and religious way of life. However, the study also adopted thematic analysis for the constructive categorisation, coding, and structuring of data into meaningful themes. The chapter then discusses the techniques of qualitative research, including the epistemological positioning of the researcher, the process of rapport establishment, the exercise of reflexivity and reflection, and the balance of power relations. The present chapter then briefly introduces the features of data collection sites, including the Bylakuppae settlement, Pandoh settlement and Sarnath. It then discusses the present work's method, including the samples, interview schedule, analytical strategy and procedure. The chapter concludes by explaining how it takes care of ethical considerations vital for maintaining the quality of qualitative research.

**Chapter 4.** This chapter acknowledges that qualitative researchers are not 'tabula rasa' but instead enter the field with their own preconceived notions and cultural conditionings. Then, the chapter

provides an overview of how the researcher, during the present fieldwork, balanced his position as an outsider with different cultural assumptions and as a researcher who should not lead his cognitive bias, which influences the standard of the present qualitative study. The chapter includes an observational as well as reflective note of his experiences during the fieldwork conducted in the Pandoh settlement, Byalakuppae settlement, and Sarnath. It outlines characteristics of this fieldwork in a descriptive manner that involves describing challenges like finding a gatekeeper, gaining clearance from the settlement officers, managing language barriers, handling cultural differences, building rapport, and describing minute details that were present in every nook and corner of the visited Tibetan settlements. The chapter ends with concluding remarks on how the field experience remains potent for establishing the need for the upcoming chapter to understand the exiled Tibetan community through a relatively new approach. The fieldwork makes the researcher realise that apart from the challenges of exile, life in India has become customary for them. They live their exiled lives more driven by their national identity than their refugee identity. Further, protesting and struggling for Tibet's cause has become integral to their life choices.

**Chapter 5.** This chapter discusses the three main themes central to the present thesis's findings. Further, the chapter provides an analytical overview of the first defining theme, 'ethnic distinctiveness', which comprises three subthemes: 'geographical distinctiveness', 'religious values' and 'cultural values'. This part discusses how identifying with the geographical richness, doctrines of Buddhism, and cultural values that teach compassion is critical in maintaining their distinct group identity. The chapter then discusses the second theme, 'faith in the Dalai Lama' - another determining factor that shapes the ways Tibetan refugees think of themselves and their existence in exile, and derive strength from their ethnic identification process. The final theme of the present chapter is 'national traits', which discusses how identification with ethnic aspects of

traditional Tibet constructs a national norm for defining the inclusion and exclusion criteria for group membership. Further, this theme shows that over time, it has become a national trait symbolic of what ‘true Tibetans’ are supposed to be. The chapter concludes that all the factors discussed together play a critical role in shaping the behavioural attitudes with which the Tibetan refugees negotiate their social and political realities.

**Chapter 6.** This chapter discusses the last three themes of the thesis, including the ‘common enemy of the nation’, ‘exiled realities and national consciousness’, and ‘everyday mobilisation’. The first central theme of the present chapter - the common enemy of the nation - discusses what psychological relevance (such as coping mechanism and group cohesion) the categorisation of an enemy plays in the lives of Tibetan refugees and how they perceive their enemy through the value window of their ethnic identity. While discussing the second theme - exiled realities and national consciousness - the chapter outlines how the contrasting realities of the exiled Tibetans as belonging to Tibet and their experiences of refugees in India instigates a feeling of uncertainty and instability among them that further motivates to continue their struggle of returning back to Tibet. The final theme of this chapter and the thesis are both the end product of the findings and define the cyclic nature of the political life of Tibetan refugees. The last theme, ‘everyday mobilisation’, consists of three subthemes: ‘through religious and cultural preservation’, ‘through education’, and ‘through political activism’. In its essence, the last theme illustrates how the Tibetan social movement is part of a larger struggle strategy which is found to be deeply embedded in the cognitive and behavioural frames through which our participants perceive their status, negotiate between national and refugee identity, organise their way of life, and make mobilisation an everyday phenomenon.

**Conclusion.** There has always been a prescribed version of how a nation should be (Billing, 1995; Anderson, 1983) and when we consider the data from our research, we get an alternative version to add to this genre. The data set displays how a nation is formed without living on territory, not within boundaries but with the psyche, practising rituals, a hope of the return to the motherland, standing united in the odds and articulating national identity through various peaceful tactics. Most of the respondents incorporated history, their ancestors, language, culture, and religion to relate to their nation. The national identity is passed and preserved through generations, and efforts are continued. Since the time of initial displacement, the fruitless efforts for independence have not blocked the vision of Tibetan mobilisation for the nation. The religious and political leader who represents Tibet, the His Holiness Fourteenth Dalai Lama, has played a major role in keeping the national spirit alive and reorganising Tibetans in exile. Dalai Lama stands as a category prototype of the Tibetan community where people all over the world recognise this community based on their leader and their religion. Further, the study concludes that the Tibetan social movement is part of a larger struggle strategy which is found to be deeply embedded in the cognitive and behavioural frames through which our participants perceive their status, negotiate between national and refugee identity, organise their way of life, and make mobilisation an everyday phenomenon.