

# Al and Co Doping of an FeSi Semiconductor

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# Background



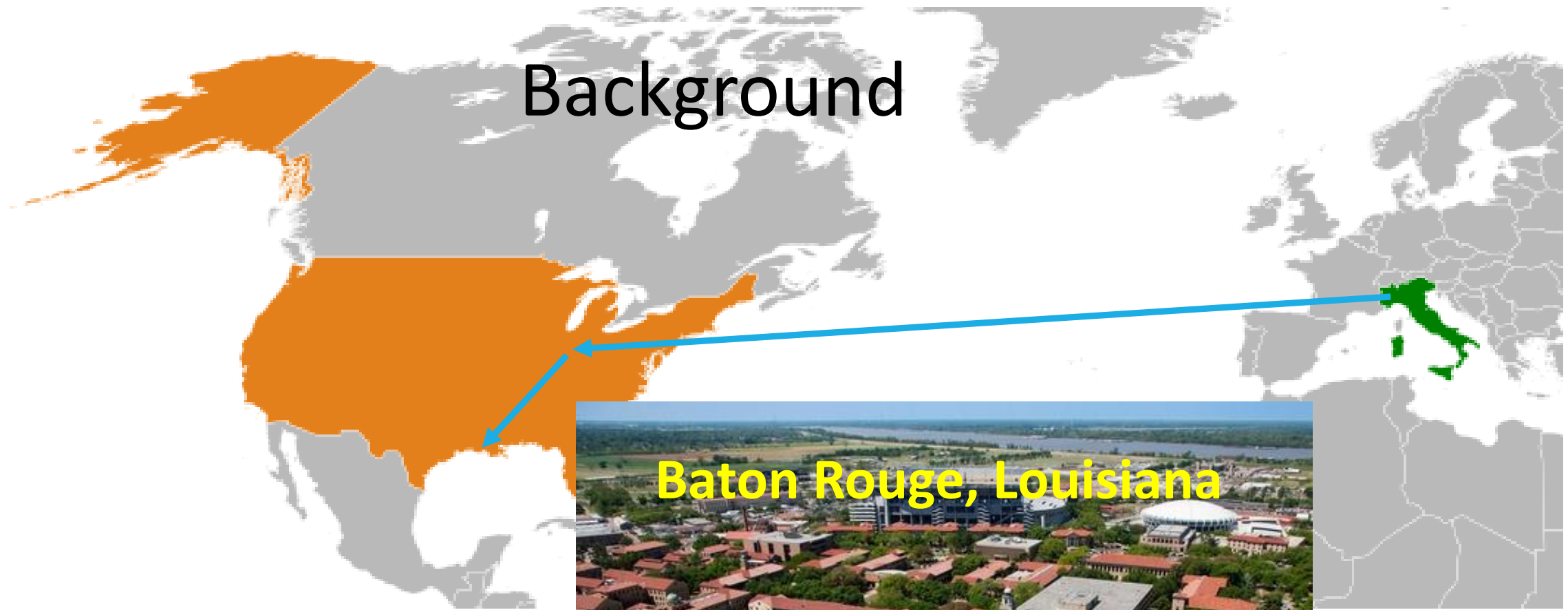
# Background



Terre Haute, Indiana



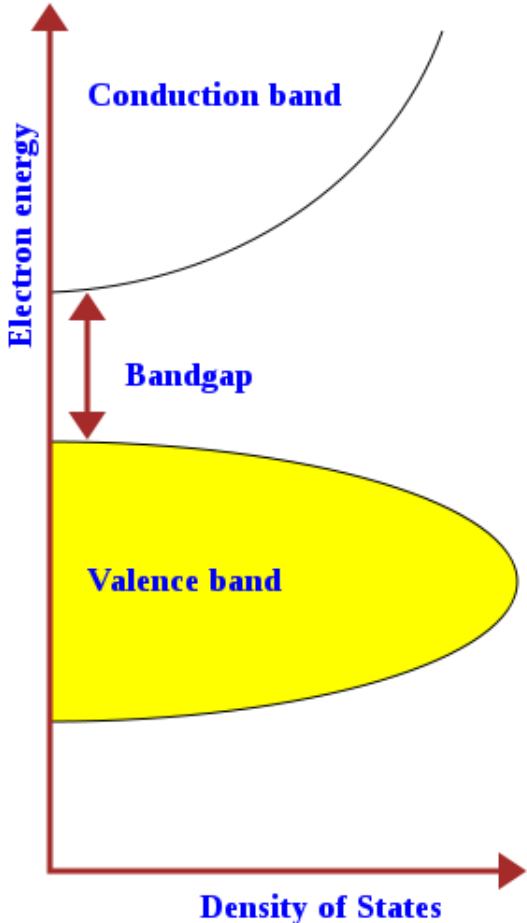
# Background



**Baton Rouge, Louisiana**

# Semiconductor Doping

										NON-METALS						He	
Li	Be	H										B	C	N	O	F	Ne
Na	Mg	METALS										Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn



**Objective:** To probe the magnetization of  $\text{Fe}_{1-x}\text{Co}_x\text{Si}_{1-y}\text{Al}_y$  as amount of Co and Al vary.



**Prediction:** While Co doping increases the magnetization, Al doping should reduce it.

# Making a Good Sample

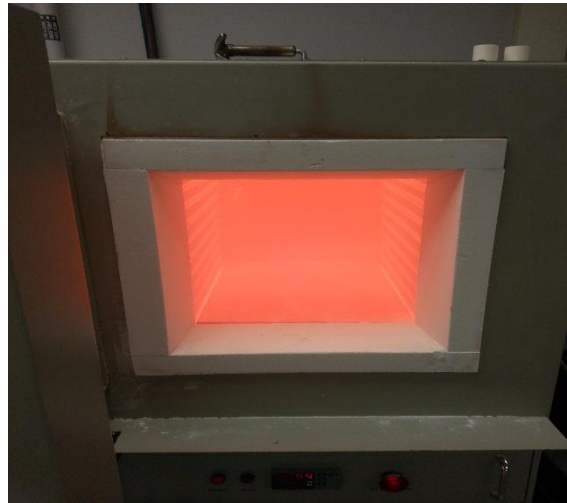
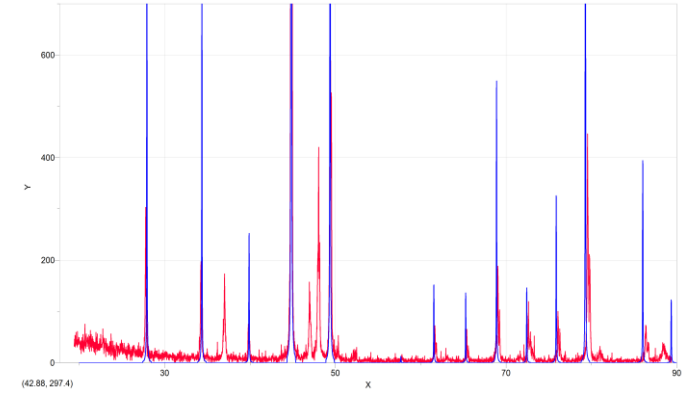


Arcmelting

Annealing

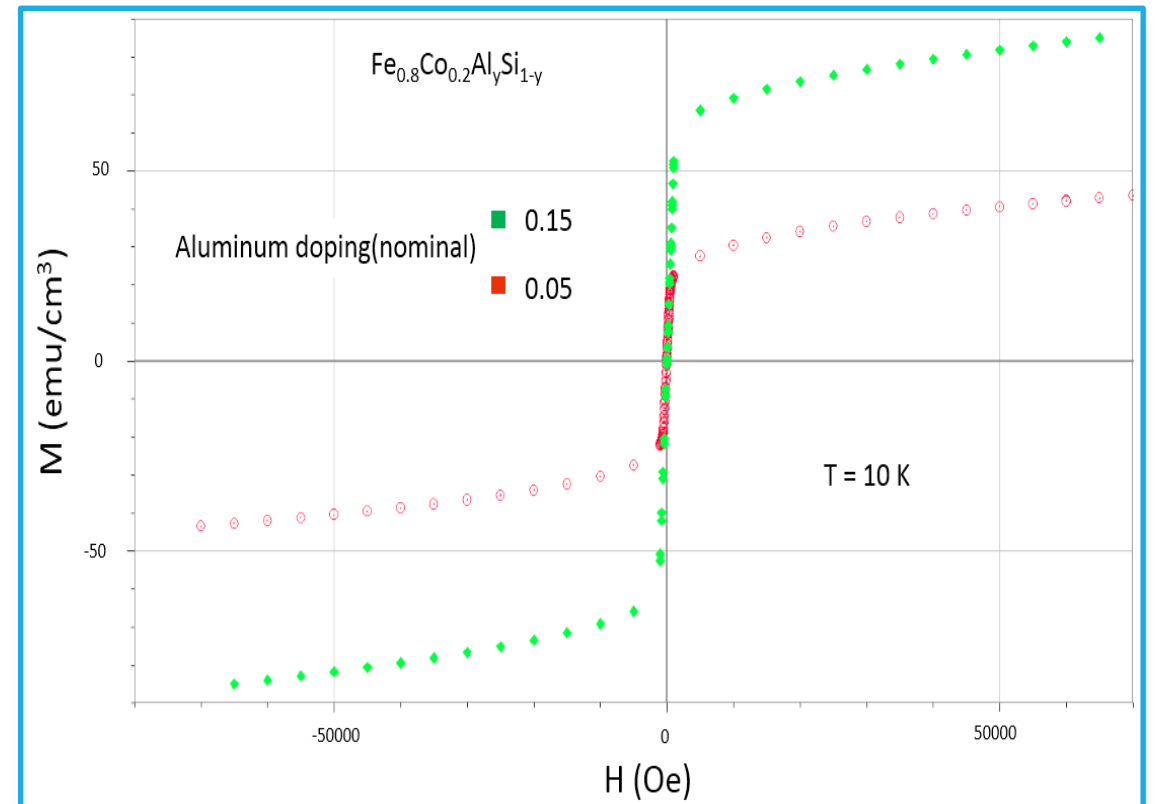
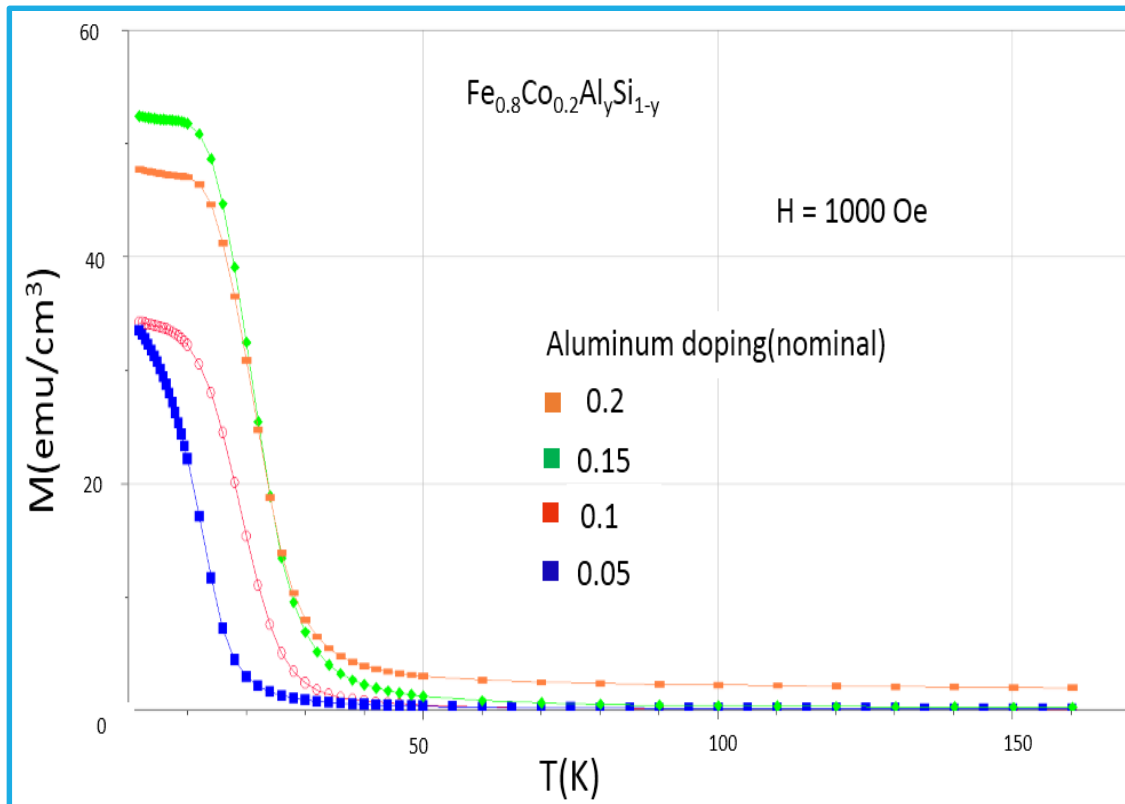
X-ray  
diffraction

Magnetization  
measurements



# Results

Magnetization appears to increase with Al doping





# Ongoing work

- Confirming the obtained results
- Different doping percentages
- Measurement of magnetoresistance and the Hall Effect

# Acknowledgements

**Dr.DiTusa**

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**Thanks to Ahmad Us Saleheen for making so many XRD measurements**



# Questions?