Cu/mordenite catalysts were found to be highly active for the SCR of NO with NH3 and exhibited high resistance to alkali poisoning. Redox and acidic properties of Cu/mordenite were well preserved after poisoning with potassium unlike that of vanadium catalysts. Fe-mordenite catalysts also revealed much higher alkali resistivity than that of commercial V2O5/WO3-TiO2 (VWT) SCR catalyst which is currently used for NOx abatement in stationary installations. Unique support properties like high surface area and surface acidity, which are not available in the commercial VWT catalyst, seem to be essential requirements for the high alkali resistance. Mordenite-type zeolite based catalysts could therefore be attractive alternatives to conventional SCR catalysts for biomass fired power plant flue gas treatment.