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**Thinh T. Kieu\*** ([thinh.kieu@ttu.edu](mailto:thinh.kieu@ttu.edu)), 4306 16th Street Quaker Pines Apt#5, Lubbock, TX 79416, and **akif Ibraguimov** ([akif.ibraguimov@ttu.edu](mailto:akif.ibraguimov@ttu.edu)), 2500 Broadway and Boston Ave, Lubbock, TX 79409. *A mixed finite element method for generalized Forchheimer flows in porous media.*

The nonlinear Forchheimer equations are used to describe the dynamics of fluid flows in porous media when Darcy's law is inadequate. We consider the generalized Forchheimer equations for slightly compressible fluids and study the mixed finite element method to approximate the resulting degenerate parabolic equation for pressure with the Dirichlet boundary condition. The optimal error estimates are proved in  $L^2$ -norm for the approximated solution in both continuous and discrete time procedures. The convergence rate is also established for the pressure in  $L^\infty$ -norm and Sobolev norm. (Received February 09, 2014)